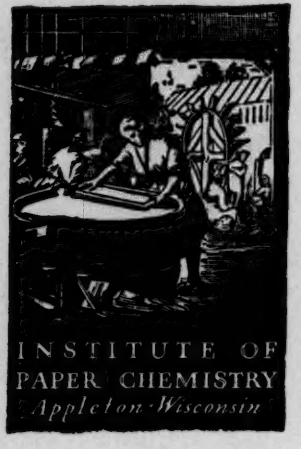
PAGES 831-901

BULLETIN

OF

THE INSTITUTE OF PAPER CHEMISTRY



AFFILIATED WITH

LAWRENCE COLLEGE

APPLETON, WISCONSIN

LIBRARY NOTES

AUGUST · 1949

Volume 19 Number 12

THE cut on the cover is a reproduction of the Bookplate of The Institute of Paper Chemistry. The drawing, entitled, "the Papermaker," first appeared in 1698 in the Book of Trade by Christoff Weigel. This particular reproduction has been copied from an illustration appearing on page 43 of Dard Hunter's book "Papermaking Through Eighteen Centuries," published in New York in 1930 by William Edwin Rudge. THE INSTITUTE is greatly indebted to Mr. Hunter for permission to use the illustration.

BULLETIN

of

THE INSTITUTE of PAPER CHEMISTRY

AFFILIATED WITH

LAWRENCE COLLEGE

APPLETON, WISCONSIN

AUGUST · 1949

Volume 19 Number 12

LIBRARY NOTES

The Bulletin of The Institute of Paper Chemistry is published monthly at Appleton, Wisconsin, by the Board of Trustees of The Institute of Paper Chemistry. Entered as Second Class matter, November 13, 1930, at the postoffice at Appleton, Wis., under the act of August 24, 1912.

THE INSTITUTE OF PAPER CHEMISTRY

Board of Trustees

OFFICERS

ERNST MAHLER	President
D. C. EVEREST	Vice-President
JOHN L. RIEGEL	Vice-President
WESTBROOK STEELE	Executive Director
JOHN G. STRANGE	Secretary-Treasurer
C. B. SITTERSON, JR.	Assistant Secretary

TRUSTEES

NATHAN M. PUSEY, President of Lawrence College, ex officio

For the term expiring in 1949

D. C. EVEREST, Marathon Corporation, Rothschild, Wis.
DAVID L. LUKE, JR., West Virginia Pulp and Paper Company, New York, N.Y.
HERBERT T. RANDALL, The Champion Paper and Fibre Company, Hamilton, Ohio.
JOHN L. RIEGEL, Riegel Paper Corporation, New York, N.Y.
NORMAN W. WILSON, Hammermill Paper Company, Erie, Pa.

For the term expiring in 1950

DAN K. BROWN, Neenah Paper Company, Neenah, Wis.
GEORGE E. DYKE, Robert Gair Company, New York, N.Y.
STUART E. KAY, International Paper Company, New York, N.Y.
A. B. LAYTON, Crown Zellerbach Corporation, San Francisco, Calif.

For the term expiring in 1951

ALEXANDER CALDER, Union Bag & Paper Corporation, New York, N.Y.
SYDNEY FERGUSON, The Mead Corporation, Dayton, Ohio.
ERNST MAHLER, Kimberly-Clark Corporation, Neenah, Wis.
W. IRVING OSBORNE, JR., Cornell Wood Products Company, Chicago, Ill.
KARL E. STANSBURY, Thilmany Pulp and Paper Company, Kaukauna, Wis.

STANDING COMMITTEES OF THE TRUSTEES

EXECUTIVE COMMITTEE: Ernst Mahler, Chairman; D. K. Brown, George E. Dyke, David L. Luke, Jr., and Karl E. Stansbury.

INVESTMENT COMMITTEE: Ernst Mahler, Chairman; D. K. Brown, John G. Strange, and Ralph J. Watts.

COMMITTEE ON ACADEMIC POLICY: Nathan M. Pusey, Chairman; Rex Hovey, Harry F. Lewis, Ernst Mahler, John L. Riegel, Westbrook Steele, and John G. Strange.

Books and Pamphlets Added to the Library During July

ADHESIVES

DeLollis, N. J., Rucker, Nancy, and Wier, J. E. Comparative strengths of some adhesive-adherend systems. National Advisory Committee for Aeronautics. Technical note no. 1863. Washington, The Committee, 1949. 43 p.

CHEMICAL REACTIONS

Amis, Edward S. Kinetics of chemical change in solution. New York, Macmillan, 1949. 332 p.

CHEMICALS—MANUFACTURE AND INDUSTRY

U. S. Tariff Commission. Synthetic organic chemicals, United States production and sales, 1947. Report no. 162, 2d series. Washington, U. S. Govt. Print. Off., 1949. 165 p.

CHEMISTRY, ORGANIC

Wild, F. Characterisation of organic compounds. Cambridge, University Press, 1948. 306 p.

DYES AND DYEING

Horsfall, R. S., and Lawrie, L. G. The dyeing of textile fibres. 2d ed., reprinted. London, Chapman & Hall Ltd. [1946, reprinted] 1949. 438 p.

FUEL

Northeastern Wood Utilization Council, Inc. *New Haven, Conn.* How to burn wood. 6th ed. Bulletin no. 28. New Haven, The Council, 1949. 18 p.

PAPER MAKING AND TRADE

Blättler, Werner. Papier [2. Ausgabe] Luzern, Im Selbstverlag des Verfassers, 1947. 204 p. + 14 samples.

Paper Makers' Association of Great Britain and Ireland. *Technical Section. Education Committee.* Paper making, a general account of its history, processes, and applications. Kenley, Surrey, The Association, 1949. 208 p.

Reed, Robert F. What the lithographer should know about paper. Technical bulletin no. 8. New York, Lithographic Technical Foundation, Inc. [c1949] 101 p.

WRITER'S PROGRAM OF THE WORK PROJECTS ADMINISTRATION IN THE COMMONWEALTH OF PENNSYLVANIA. The story of paper [written by Gladys Strome and ed. by Elizabeth Smedley] Chicago, Albert Whitman & Co., 1943. 43 p.

POLYMERS AND POLYMERIZATION

BURK, R. E., and GRUMMITT, OLIVER, ed. High molecular weight organic compounds. Frontiers in chemistry, v. 6. New York, Interscience Publishers, 1949. 330 p.

MONOMERS, a collection of data and procedures on the basic materials for the synthesis of fibers, plastics, and rubbers, ed. by E. R. Blout, W. P. Hohenstein, and H. Mark. New York, Interscience Publishers, 1949. Loose-leaf.

RADIO

MONTGOMERY, CAROL G., ed. Technique of microwave measurements. New York, McGraw-Hill Book Co., 1947. 939 p.

RAGAN, GEORGE L., ed. Microwave transmission circuits. New York, McGraw-Hill Book Co., 1948. 725 p.

RADIOACTIVITY

[CURTISS, LEON F.] Measurement of radioactive isotopes. U. S. National Bureau of Standards circular 473. Washington, U. S. Govt. Print. Off., 1948. 12 p.

FRIEDLANDER, GERHART, and KENNEDY, JOSEPH W. Introduction to radiochemistry. New York, Wiley, 1949. 412 p.

REFRIGERATION AND REFRIGERATING MACHINERY

The AMERICAN SOCIETY OF REFRIGERATING ENGINEERS. The refrigerating data book. Basic volume. 6th ed. [New York, The Society, c1949] 692 + 248 p.

RUBBER—BIBLIOGRAPHY

AMERICAN CHEMICAL SOCIETY. *Division of Rubber Chemistry.* 1942-1943 bibliography of rubber literature (including patents). Akron, The Division [1948] 352 p.

STATISTICS

U. S. BUREAU OF THE CENSUS. Historical statistics of the United States, 1789-1945; a supplement to the Statistical abstract of the United States, prepared by the Bureau of the Census with the cooperation of the Social Science Research Council. Washington, U. S. Govt. Print. Off., 1949. 363 p.

TRADE DIRECTORIES

AMERICAN BOXMAKER directory. Annual 1949 edition. Washington, Howard Publ. Co., 1949. v. 2. 478 p.

WALDEN'S ABC guide, edition for 1949. The annual paper directory for manufacturer, merchant, converter [New York, Walden, Sons & Mott, Inc.] 1949. 476 p.

Survey of Periodical Articles

The following are abstracts of opinions expressed by writers in the technical journals. The Institute of Paper Chemistry takes no responsibility for the opinions here summarized.

ALUM

KONOW, R. VON. Water and alum. Finnish Paper Timber J. 28, no. 23: 363-9 (Dec. 15, 1946). [In Swedish; English summary]

After a brief introductory description of the structure of the atom and molecule, the author shows how various phenomena—such as surface tension, solution, dissociation, and coagulation—can be explained on the basis of the polarity of water. Particular reference is made to the formation of aluminum ion complexes; the aluminum ion surrounded by six water molecules is considered the fundamental form from which all other aluminum complexes in water solution can be derived. 9 figures. E.S.

ANTIOXIDANTS

MORAWETZ, HERBERT. Phenolic antioxidants for paraffinic materials. Ind. Eng. Chem. 41, no. 7: 1442-7 (July, 1949).

Thirty-four phenolic compounds and two xylene-formaldehyde condensation products were evaluated as antioxidants for paraffin wax at 163° C. and several relations between chemical structure and antioxidant efficiency were established. Alkyl substitution in the reactive ortho and para positions and halogen substitution in the para position were shown to improve the stabilizing efficiency of phenolic antioxidants. High activities were observed with bisphenol linked by methylene, sulfur, or thionyl. Increased antioxidant efficiency was also obtained by introducing a second hydroxyl group into a substituted phenol. Substituted resorcinol and pyrocatechol were equally effective. The principles outlined above are applicable to the stabilization of paraffin wax and chemically similar materials. E.S.

BARK

SNOW, E. A. Pine bark as a source of tannin. J. Am. Leather Chemists Assoc. 44, no. 7: 504-11 (July, 1949).

The potentialities of pulp-mill waste bark of shortleaf, loblolly, and Virginia pines as a commercial source of tannin in the Tennessee Valley have been investigated. A test of mixed pine-bark waste showed a tannin content of more than 5%, and a light leather of desirable quality was produced on a laboratory scale with the extract. Analyses run on fresh-peeled pine bark and on bark stored under cover for one, four, and eight weeks showed no appreciable loss of tannin up to eight weeks of aging. Collections of bark samples were made from both pulpwood- and sawtimber-size trees of the three species grown in different localities, and from three points of each tree butt, middle, and top of merchantable stem. Significant variations were found to exist between localities for shortleaf and loblolly, but not for Virginia pines. Sawlog-size trees were found to have higher tannin contents than pulpwood-size trees, sampling height showing no consistent trend. The barks of shortleaf and loblolly pines gave appreciable quantities of tannin, averaging 5.4 and 4.5%, respectively. These pines have a high bark volume

relative to total merchantable stem volume, averaging 18% for trees suitable for sawlogs and 24% for trees suitable for pulpwood. Virginia pine, on the other hand, appeared uneconomic with a tannin content of 3.7% and bark volume of only 13%. Separate analyses on the inner and outer bark of shortleaf and Virginia pines showed the inner bark to be appreciably lower in both tannin content and purity. It would be desirable to make further studies on sulfite extractions of tannin from pine bark and on tanning tests with such extracts. E.S.

BEATING

TOPPING. Recent advances in beating. Paper-Maker (London) 117, no. 5: 337-8 (May, 1949).

The degree of uniformity of stock produced in beaters that can be attained by craftsmanship (or the old rule of thumb method) is incompatible with higher speeds on fine paper machines. The higher the machine speed, the more sensitive it becomes to variations in stock preparation (or any other variations). Only when a definite and unchanging furnish, definite degrees S.-R., and a definite beating cycle and consistency are maintained, can a beaten stock of consistent quality be produced which, in turn, assists the machines to run consistently at their maximum speeds. Any modern beating equipment that lends itself to the maintenance of automatic regularity can be considered the correct type. Results with "chemical beating" are described, i.e., beating in the presence of chemical substances, such as starch or certain cellulose derivatives. In the case of a special paper, the addition of 2% of a prepared starch resulted in a standard quality of finished paper which conformed to a rigid specification and which could be run on the machine with a 37% increase in speed. Cellulose esters, added in powder form to the beater early in the cycle, produced some remarkable effects. With additions of 4-5%, as soon as solution took place, the stock assumed increasing sliminess and the beating degrees rose alarmingly, from approximately 25 to 75-80. The sliminess or wetness persisted throughout the papermaking procedures; however, unlike true hydration, it was completely destroyed by a pH below 6. Hence, in the use of these materials, the sizing process must be carefully observed before the introduction of the cellulose derivative. Some of the finished papers made under the above conditions showed very marked increases in tensile, bursting, and tearing strengths. E.S.

BLEACHING—SULFATE

SAVAGE, J. V. The Camas kraft pulp bleach plant. Pulp Paper Mag. Can. 50, no. 7: 106-8 (June, 1949); Pulp & Paper 23, no. 8:78-9 (July, 1949); *cf.* B.I.P.C. 19: 332.

The layout and operation of the new Camas, Wash., kraft pulp continuous bleach plant of the Crown Zellerbach Corp. are described. The eight stages involve a low-density chlorination followed by high-density caustic extraction and agitated soaking, a second low-density chlorination and high-density caustic extraction, a high-density (10% consistency) and low-density (6%) hypochlorite bleach, followed by treatment with sulfur dioxide to prevent subsequent color reversion. The final stage is only necessary when the pulp is dried and baled for export; it is not used when the pulp is sent in slush form to the integrated paper mill. The plant is designed for the bleaching of 150 tons daily of pulp made from a variety of wood species, including Douglas fir. Flexibility is essential in all operations; a system of three-way valves and pipes with the necessary chemical treatment equipment makes it possible to alter the bleaching sequence in several different ways or to bypass any of the stages, using only the number necessary for the particular grade in process. The plant uses approximately 70,000 gal.

of water, 4000 lb. of steam, and 196 kw. of electric power/ton, when all stages are employed. E.S.

BOARD

ANON. Sulphur to stiffen .009. Fibre Containers 34, no. 7: 45 (July, 1949).

A new process developed at The Institute of Paper Chemistry for increasing the rigidity of corrugated board is based on the impregnation of the corrugating medium with molten or plasticized sulfur. It may be done from one or both sides of the medium, separately or during the corrugating operation. Press rolls, 10-14 inches in diameter, heated to a surface temperature of about 280° F., are so arranged that the bottom roll runs in a molten-sulfur bath. For one-side application the medium is run directly between the press rolls; for application to both sides, it is run under a sulfur-submerged roll and then through the press rolls. The rolls drive sulfur into the interior of the medium and remove the excess, leaving a relatively free fiber surface, compatible with aqueous adhesives. The sulfur content should be 50-60% of the weight of the uncorrugated medium. Corrugated board made from the treated medium has better flat and box compression, especially at high humidities. It should not be used for packaging silver, nickel, or products sensitive to odors. R.R.

DYKE, GEORGE E. Changes in demand for paperboard. Shears 67, no. 679: 18, 38 (July, 1949); Am. Boxmaker 38, no. 8: 18-19 (August, 1949).

The author believes that paperboard production has fallen below demand and that there is evidence of inventory shortages which will renew demand. If the estimated 1949 production of approximately 8,600,000 tons is realized, it will be the third largest annual production for the industry. R.R.

LATHROP, E. C., and NAFFZIGER, T. R. Evaluation of fibrous agricultural residues for structural building board products. III. A process for the manufacture of high-grade products from wheat straw. Tappi 32, no. 7: 319-30 (July, 1949); *cf.* B.I.P.C. 19: 463.

The details of a process for the manufacture of high quality, very rugged insulating building board from wheat straw are presented. Two kinds of pulp are required: (1) unhydrated long-fibered pulp, and (2) hydrated pulp equivalent to that used in strawboard manufacture. Two methods are described for the preparation of these: by pressure cooking or by a new, very rapid method of atmospheric cooking and disk refining. The effect of operating variables on physical properties, such as straw varieties, cooking and refining, percentage of hydrated fiber and long fiber in pulp blends, and percentage of moisture of board into drier, have been carefully studied. Based on previous fundamental work it is possible to arrange this information in the form of an accurate operating range of pulp blends as related to properties of finished product. Because of the stringy straw fibers the board may be dried at 50 to 55% moisture content with large savings in drying costs. Dense boards may be made by drying in the hydraulic press. Process equipment and economics are discussed. 11 tables and 13 figures. E.S.

BOARD MILLS

ANON. Making paperboard at Macon. Paper Ind. 31, no. 4: 452-8 (July, 1949); *cf.* B.I.P.C. 19: 690, 758.

An illustrated description of the new board mill at Macon, Ga., is given. E.S.

ANON. Masonite Corporation, its products, operations, and history. Southern Pulp Paper Manuf. 12, no. 7: 71-3 (July, 1949).

The development of the Masonite process, domestic and foreign operation, and the principal products manufactured and marketed by the corporation (listed by trade name), are described. E.S.

ANON. New Michigan mill advances in engineering. Pulp & Paper 23, no. 8: 40, 42, 44, 46-7 (July, 1949); *cf.* B.I.P.C. 19: 381-2.

An illustrated description is given of the new Battle Creek mill of the Michigan Carton Co. R.R.

FORT WAYNE CORRUGATED PAPER COMPANY. 40 years of container manufacturing. Shears 67, no. 679: 39-40 (July, 1949).

A history is given of the Fort Wayne Corrugated Paper Co., which began operations in 1908 in a corner of the Olds Wagon Works, Fort Wayne, Ind., with recorded sales of $820,431 for the first year. In 1913 the company and two others were merged to begin expansion to the present widespread organization with box plants in four cities and two board mills, one with the Robert Gair Co., Inc., and a 1948 sales figure of $15,732,624. The size, number of employees, production of each plant, and the officers of the organization are given. The material is abridged from an anniversary publication. R.R.

BOARD SPECIALTIES

VICKER, RAY. Dollar savings through expendable pallets. Mill & Factory 45, no. 1: 105-7 (July, 1949).

The author discusses expendable pallets, particularly those made by the Addison-Semmes Corp., Racine, Wis., and gives typical instances of economies effected by their use. The standard expendable kraft corrugated pallet weighs from 3 to 14 pounds, costs about $1.00, and occupies less space and is lighter than a wooden skid or pallet. The Addison-Semmes Corp. also produces a corrugated tote box, available in any desired size, which can be used with a pallet for handling small shipments. R.R.

BOARD TESTING—PHYSICAL

HRUBESKY, C. E. Comparison of several freeness testers on board stock; Williams freeness values. Tappi 32, no. 7: 315-18 (July, 1949); *cf.* B.I.P.C. 19: 303-4.

In co-operation with the Raw Materials Testing Sub-committee of the TAPPI Structural Fibrous Materials Committee, Williams freeness tests were made at the U. S. Forest Products Laboratory on 15 structural board stocks to compare with values previously obtained with five different freeness testers. Although no exact correlation was found to exist between the freeness values obtained with the Williams and the other testers, the spread in values for different stocks obtained by using a relatively high consistency is approximately of the same order as values obtained with the Schopper-Riegler oversize tester, which showed a greater spread than the other testers used. E.S.

KOLLMANN, F. Properties, testing, and classification of fiberboard and building board from wood waste. Svensk Papperstidn.

52, no. 10: 251-67 (May 31, 1949). [In German; English and Swedish summaries]

The importance of fiberboard and building board from wood waste has greatly increased during the last two decades. The testing of the properties of these boards, on the other hand, has not yet been satisfactorily developed. Reference is made to the German standard DIN 52350 issued in October, 1943, several U. S. federal and A.S.T.M. specifications, and the preliminary Swedish specification published in 1947. The need for an international standardization program is stressed and efforts along this line sponsored by the Food and Agriculture Organization of the United Nations are mentioned. The properties of such boards can be grouped as follows: general properties (dimensions, color, and surface qualities and treatment); physical properties (density, moisture content, water absorption and swelling in moist air and water, water permeability, heat conductivity, and sound insulation and absorption); elasticity and strength properties (modulus of elasticity, compressibility perpendicular to the board surface, breaking strength, tensile and bending strength, shock resistance, fatigue, modulus of rupture in torsion and shear, and hardness); technological properties (workability, gluing properties, nail-holding power, and resistance to abrasion); and resistance to decay, insects, fire, and chemical corrosion. The significance of these properties and their evaluation, the dependence of the results on the size of the specimen and the testing procedures employed, and work by previous investigators are reviewed. The best index for classifying fiberboards is the density. Sufficient preliminary data for the international standardization of testing procedures are available. Some recent developments include a revision of the 1943 edition of DIN 52350, an Austrian draft based on the German standard, the Swedish preliminary specification, and suggestions from the U. S. Forest Products Laboratory. 20 references. E.S.

CELLULOSE

HIRST, E. L., ISHERWOOD, F. A., JERMYN, M. A., and JONES, J. K. N. Pear cell-wall cellulose. J. Chem. Soc., Supplementary issue, no. 1: S182-4 (1949).

A cellulose isolated from pear cell wall has been shown to be identical with cotton cellulose. Hydrolysis with 72% sulfuric acid gave only D-glucose. Methylation in nitrogen gave a trimethyl derivative which on hydrolysis gave 2,3,6-trimethyl D-glucose (90% of theory) and 0.6% of 2,3,4,6-tetramethyl D-glucose. This corresponded to a chain length of 160 units. The chain length of the native cellulose was probably much longer because the drastic purification necessary to remove the other polysaccharides undoubtedly caused some degradation. E.S.

CELLULOSE, BACTERIAL

MASSON, C. R., and MELVILLE, H. W. Osmometry of high polymer solutions. I. Osmometer and membranes. J. Polymer Sci. 4, no. 3: 323-36 (1949).

The construction of a thermostatic osmometer of the Fuoss-Mead type is described (*cf.* J. Phys. Chem. 47: 59-70 [1943]). The technique of preparation of bacterial cellulose membranes for osmotic measurements on high polymer systems is given. The permeability of such membranes may be controlled by growth to a thickness of 4-5 mm., drying in contact with a stainless steel surface, and reswelling in water or alcohol-water mixtures. The degree of reswelling required to give membranes suitable for use with polymers of a range of molecular weights is specified. The factors affecting the behavior of the membranes in the osmometer are discussed. E.S.

MASSON, C. R., and MELVILLE, H. W. Osmometry of high polymer solutions. II. Osmotic measurements using bacterial cellulose membranes. J. Polymer Sci. 4, no. 3: 337-50 (1949).

Bacterial cellulose membranes have been used successfully to measure the osmotic pressures of a number of high polymer-solvent systems. The dynamic method of Fuoss and Mead has been used in most cases, but for polyvinylxylene in benzene the rate curves are not symmetrical, since the solvent passes through the membrane faster from the solution side. The molecular weight values for two polyvinyl acetates agree well with the calculated kinetic values, and for polyethyl sebacate the value obtained agrees with that found by end-group titration. Values of the Huggins "constant" μ are given for various systems. 14 references. E.S.

CELLULOSE ESTERS—NITROCELLULOSE

CAMPBELL, H., and JOHNSON, P. Investigations on cellulose nitrate. II. Liquid and vapor phase adsorption of acetone. J. Polymer Sci. 4, no. 3: 247-63 (1949); *cf.* B.I.P.C. 19: 306.

The discrepancies in the published work on the interaction of acetone and cellulose nitrate are discussed and explained. Isotherms for the vapor-phase adsorption of acetone by cellulose nitrate have been determined with an adsorption balance. They have been shown to be independent of the crystalline-amorphous ratio of the polymer but dependent upon its nitrogen content. In cellulose nitrates which are completely soluble in acetone, no limiting adsorption has been found. Adsorption analysis (a modification of chromatography) has been applied to the determination of the liquid phase adsorption by cellulose nitrate of acetone from mixtures with petroleum ether. In terms of the liquid mixture concentrations, there appears to be limited adsorption, but this is shown to be caused by the nonideal nature of the solutions of acetone and petroleum ether. When allowance is made for this, the liquid- and vapor-phase isotherms are the same within experimental error and do not support the existence of compounds of acetone and cellulose nitrate. 18 references. E.S.

CHÉDIN, JEAN. Topochemical reactions of cellulose: nitration. Chimie & industrie 61, no. 6: 571-9 (June, 1949). [In French]

The author reviews briefly the state of knowledge regarding the molecular composition of mixtures of nitric acid, sulfuric acid, and water as presented in a general conference on nitration held in 1945. Depending on the relative concentrations of the constituents, three zones are defined: (1) the mixture contains no nitric acid as such, being entirely dehydrated by sulfuric acid. Recent work in England (reported in part in 1945) has demonstrated that the concept that nitric acid anhydride exists as a complex $H_2SO_4 \cdot N_2O_5$ is not correct and that it is in reality an ionic complex $HSO_4^- \cdot NO_2^+$. (2) The nitric acid is partially dehydrated. (3) Sufficient water is present to form an equilibrium between nitric and sulfuric acid hydrates. Since the 1945 conference the author has determined by two methods (Raman spectrography and colorimetry) the partition coefficient of water between the two acids. The data are presented graphically and it is shown that the nitrating power of an acid mixture depends primarily on the real concentration of unhydrated nitric acid. Various aspects of these relationships on the nitration process are discussed. Based on the concept that cellulose is made up of crystalline and amorphous regions, a general hypothesis has been advanced that the amorphous regions are accessible to the entire nitration acid mixture, whereas the crystalline regions can be penetrated by nitric acid but not by sulfuric acid. Therefore, at equilibrium, the liquid remaining in the

fibers (after pressing) can be represented by $B.I. = a\,VA + (L - a)\,\alpha\,\%HNO_3$, where B.I. is the composition of a unit part of the liquid remaining in the fibers, VA is the composition of the nitration liquid as a whole (represented by the composition of the liquid drained off), a is a fraction of one unit part, and α represents the degree of water dilution of the nitric acid assumed to be in the crystalline regions. By a series of experiments applying different degrees of pressing to nitrated cotton linters the author has shown that—as expected from the equation—with increasing pressure a diminishes whereas α and the amount of excess nitric acid per gram of cotton linters remains essentially constant. It is pointed out, however, that this relationship does not afford a means of estimating the degree of crystallinity of cellulose, since the amount of excess nitric acid taken up varies with the composition of the nitric acid. It is greater with mixtures which are richer in nitric acid and lower with mixtures rich in sulfuric acid. Thus sulfuric acid is not excluded from the crystalline regions, but its rate of penetration is much slower than that of nitric acid, and the nitric acid usually reacts preferentially with the cellulosic hydroxyl groups in the more ordered regions. M.A.H.

ROBERTS, A. G. Diphenylamine test for nitrates in mixtures of cellulose esters. Anal. Chem. 21, no. 7: 813-15 (July, 1949).

Speed and strength of color development were used as criteria to evaluate the utility of a variety of diphenylamine indicator solutions with a wide range of nitrate compositions in the form of films cast from mixtures of cellulose esters. The plot of time for color development *vs.* nitrogen content has a minimum value in the 2 to 6% nitrogen region. Water content is shown to be a critical factor, and diphenylamine concentration is found to exert a minor influence. Although no single indicator solution is best for all nitrate contents, a suitable reagent for qualitative tests over a wide nitrate range consists of 0.1 gram of diphenylamine, 100 ml. of concentrated sulfuric acid, and 30 ml. of water. The method can be used for estimating nitrate nitrogen content by comparing samples with a series of film standards of known nitrate composition. 13 references. E.S.

CHEMICAL TESTING—CELLULOSE—POLYDISPERSITY

HERRENT, P., and GOVAERTS, R. Polydispersity of wood pulp cellulose. J. Polymer Sci. 4, no. 3: 289-307 (1949). [In French]

The existing experimental procedures for the determination of the chain-length distribution of cellulose have been critically examined, with a view to its possible use in the evaluation of wood pulps for the production of viscose and acetate rayon and as a means of studying the changes brought about in the cellulose during the manufacturing process. Fractional precipitation of cellulose nitrate from acetone solution by water, and viscometric determination of the degree of polymerization were selected as the most feasible tests for a mill laboratory. The authors have sought to develop a procedure which would be simple, practical, and, above all, perfectly reproducible. In doing so, they point out several sources of error and describe the measures taken to overcome them. First, the drying of the samples, particularly after swelling in alkaline solutions, must be carried out very carefully to avoid hydrogen bonding between adjacent hydroxyl groups and subsequent insolubility of the nitrate. (In addition to determining the chain-length distribution of the original pulp sample, it is usually dissolved in cupriethylenediamine to break the weak linkages, reprecipitated, and the chain-length distribution also determined on this regenerated pulp.) The water washing is finished with organic solvents (alcohol, ether), the material dried for 30 minutes in a current of dry air, and then for 15 minutes

under a vacuum of 10 cm. mercury, at room temperature. Second, it has been shown unquestionably that acetone solutions of cellulose nitrate become seriously and progressively degraded on standing for more than a few hours. Resultant errors are avoided by not dissolving the nitrate (stable while dry) until just before the viscosity measurement is made, so that the whole operation does not take more than two hours. Third, the solution viscosity measurement requires an acceleration correction if the radius of the viscometer capillary is greater than 0.01 cm. A method for calculating and applying this correction has been developed and is illustrated. In presenting the results of the chain-length distribution, the classical integral curve has been constructed but, instead of deriving a continuous chain length distribution curve from this, a discontinuous distribution into ranges or classes is preferred. 18 references. M.A.H.

CHEMICAL TESTING—PULP—TURBIDITY VALUE

HEUSER, EMIL, SHOCKLEY, WILLIAM, and VAN DEN AKKER, J. A. Determination of the suitability of wood pulp for acetylation. Tappi 32, no. 6: 251-3 (June, 1949).

An improved method for determining the suitability of wood pulp for acetylation is described. Previously, Jayme and Schenck (*cf.* B.I.P.C. 15: 320-1) indicated that the Pulfrich photometer might be used to determine quantitatively the haziness (turbidity) of a solution of the primary acetate from a wood pulp. This turbidity was then used as an index of the suitability of the pulp for conversion purposes. In the present work the Pulfrich photometer is replaced by the transparency meter (*cf.* Wicker, B.I.P.C. 8: 106-7; 9: 119; 10: 205; and Instrumentation studies XVII, B.I.P.C. 7: 432), in which the ratio of parallel transmission (I) to total transmission (II) is principally a function of light scattering resulting from suspended particles. The turbidity, which is 100 minus the transparency ratio (equal to 100 [(I)/(II)]), when divided into an arbitrary constant (e.g., 100), gives a "suitability number"; this was 59 for cotton linters, 13 for a conversion pulp, and 1.1 for an unbleached Mitscherlich pulp. W.S.

CHIPS

BACKMAN, ALBERT. The influence of chip thickness on pulp yield and quality when cooking with parallelepipedic chips. Finnish Paper Timber J. 28, no. 13: 200-4, 206-8 (July 15, 1946). [In Swedish; English summary]

Cooking experiments at the A. B. Centrallaboratorium, Helsingfors, are described in which the effect of chip thickness on yield and properties of the resulting pulp was studied. Northern spruce was used for the sulfite, and northern pine for the sulfate cooks. The chips were cut as rectangular parallelepipeds, 35 mm. long and 25 mm. wide; the thickness varied from ½ to 5 mm. for sulfite and from ½ to 7 mm. for sulfate cooks. Cooking to three different degrees of delignification was accomplished by varying the cooking period for the sulfite and the amount of alkali for the sulfate process. To test the reliability of the results, narrow- and wide-ringed spruce was used for sulfite, and pure heartwood and sapwood for sulfate cooks. The results indicate that the pulp yield and papermaking properties vary with chip thickness; a marked maximum occurs at about 3 mm. Very thin chips give particularly poor results, although the decrease varies with different properties. On the whole, the strength characteristics vary directly with chip thickness; the tear strength of sulfate pulps is excepted. Here, the results were irregular and require further studies. Chips obtained from a mill chipper usually give lower strength properties than chips cut by hand

in the laboratory. This results from an average size of mill chip which is less than 3 mm. The characteristics of mill-chipping equipment may be tested by comparison of the pulps derived from mill chips and from hand-made chips, cut 3 mm. thick, and cooked under identical conditions. 2 tables and 23 diagrams. E.S.

ENROTH, AARNE. The Kanto chip classifier and its influence on the properties of chemical pulp. Finnish Paper Timber J. 28, no. 11: 172-81 (June 15, 1946). [In Swedish] *cf.* B.I.P.C. 16: 279.

The construction and operation of the Kanto chip classifier are described. Experimental cooks with the different fractions from the classifier are discussed and the influence of knotty chips on chemical and physical properties of the resulting pulps is illustrated by graphs. 29 figures. E.S.

CHROMATOGRAPHY

WISE, LOUIS E., GREEN, JOHN W., and RITTENHOUSE, RUTH C. Paper partition chromatography of simple sugars, as applied to pulp hydrolyzates and to other related substances. Tappi 32, no. 7: 335-6 (July, 1949).

Paper partition chromatography was applied to the qualitative separation of simple sugars obtained from various polysaccharidic papermaking materials, such as partially hydrolyzed aspen and sprucewood, holocelluloses, soda, kraft, and sulfite pulp, and α-cellulose from black spruce, and such beater additives as guar, *Iles mannane,* and other related substances. The application and limitations of the method are discussed briefly. (The chromatogram has been inadvertently cut down so that the complete chemical reactions are not shown.) E.S.

COLOR

HAMLY, D. H. The Ridgway color standards with a Munsell notation key. J. Optical Soc. Am. 39, no. 7: 592-9 (July, 1949).

A correlation of a copy of Ridgway's "Color standards and nomenclature" with the Munsell "Book of color" is presented. This key will prolong the usefulness of data already recorded in Ridgway terms, but is not recommended for making new observations in terms of specific color names. E.S.

COLOR-BLINDNESS

MIDDLETON, W. E. KNOWLES, and HOLMES, MARIAN C. The apparent colors of surfaces of small subtense—a preliminary report. J. Optical Soc. Am. 39, no. 7: 582-92 (July, 1949).

The early observations of König on the apparent tritanopia of the central fovea were confirmed by Willmer and Wright. Hartridge showed that the small size of the test field, rather than the location of its image on the retina, leads to the tritanopia. In the present work, 20 colors around the Munsell five-plane were observed against a dark grey background at an angular subtense of two minutes and one minute of arc, under Macbeth (6800° K.) daylight. They were matched with a complete chart of the five-plane on a similar background and under the same illumination, a mask being provided for the isolation of one color. The phenomenon is somewhat personal but its main features are beyond question. The locus of the "reduced" colors approximates an ellipse with its long axis in the general direction of red to blue-green; the eccentricity varies with different observers. The

displacement of most of the colors is approximately toward or away from the blue end of the spectrum. There is evidence that the phenomenon cannot be explained by the effect of the macular pigment, but the "dominator-modulator" theory of Granit would seem to offer an explanation for it. 14 references. E.S.

CONTAINER INDUSTRY

ANON. How to package for more salability. Modern Ind. 18, no. 1: 45-9 (July, 1949).

Basically, packages should appeal strongly to the customer, give the product complete protection during transit, and cut the cost of getting the product to market. Emphasis in packaging today includes improved closures, re-use value, display value, visible price, and packages that can be broken up into popular-sized lots with a minimum of repackaging. A proposed package must be investigated to make sure that it is practical to produce. Design for good protective packaging begins with an analysis of the handling given to the product. Specifications for each item of packaging material, facilities for checking supplier conformity to specifications, conformation of the package to carrier regulations, instructions to salesmen, distributors, and dealers regarding the new package, adaptability of the package to high stacking and display, proper marking for any special handling, and economy must be considered. In conclusion, supply and cost analyses of various types of containers are given. Photographs illustrate particularly successful packages. R.R.

MOORE, W. CLEMENT. What is your financial status? Shears 67, no. 679: 15 (July, 1949).

From the 24th annual survey of the setup-paper-box industry the author has tabulated the profits, sales cost, and investment return for reporting companies. He suggests that manufacturers compare their figures with the data given to determine whether they are above or below average. R.R.

PACKAGING PARADE. Packaging trends by areas. Packaging Parade 17, no. 198: 50, 52, 79-80 (July, 1949).

A summary is presented of container trends and current conditions in various parts of the country as reported by U. S. Department of Commerce field offices. The demand for paper and paperboard containers on the West Coast was fairly well balanced for the first quarter of 1949. Flexible package converters and distributors reported a good volume during the same period. Important new advances are expected in new packaging techniques during the year. In New England, the demand for paper and paperboard containers fell during the first quarter of 1949. The dollar value in folding-box demand was 10-20% lower than the last quarter of 1948. The decline in setup-box demand was not as great. The demand for corrugated and solid fiber shipping containers declined about 10% from the same period in 1948. In New York and the Middle Atlantic states, the demand for paper and paperboard containers has been poor to good, with a general decline in both dollar and physical volume from a year ago; prices are approximately 5% under 1948. The outlook for the rest of the year appears good. The demand for plastic containers continues strong. In the North Central states the demand for most paper and paperboard containers was down from the first quarter of 1948. Raw materials are plentiful, with some easing in prices and higher quality of paper and board. The general consumer demand for folding paper boxes fell in January, but picked up later. Competition between Midwestern container manufacturers was much more evident than in the fourth quarter of 1948. The demand for paper and

paperboard containers in the Midwest was slightly lower than during the same period of 1948. Prices were fairly stable. Metal, glass, and wood containers are also considered. R.R.

PACKAGING PARADE. West Coast packaging needs. Packaging Parade 17, no. 198: 84-5 (July, 1949).

An enumeration is given of new processes, materials, or machines resulting from industrial research which would be of most value to package users. Fifty suggestions are given, including a folding carton-type six-bottle beverage carrier of strong vulcanized fiber to increase the number of round trips; a paper container with the protective characteristics and the price of paper, but with textile strength; a high MVT heat-sealing carton liner for food products; and an insect-repellent board for cereal cartons. R.R.

CONTINUOUS COOKING PROCESS

RICHTER, JOHAN. Continuous cooking of kraft. Tappi 32, no. 7: 330-4 (July, 1949); *cf.* B.I.P.C. 19: 83.

A Kamyr pilot plant of 8 ton/24 hr. capacity has been successfully operated for the continuous cooking of kraft. The quality of the product, the economy of the process, and the initial installation costs compare favorably with the batch system. The operation has proved extremely flexible, reducing manpower to a minimum. The steam consumption is less than 2000 lb. of steam/ton of pulp. Details on the development and construction of the plant are given (*cf.* U. S. patent 2,474,862 [July 5, 1949] B.I.P.C. 19: 820). 5 figures. E.S.

DISINFECTION AND DISINFECTANTS

STITT, WILLIAM D. Production of mold resistant paper and paperboard. Paper Mill News 72, no. 28: 10, 12 (July 9, 1949).

Methods of treatment to obtain mold resistance employing alkali metal salts of chlorinated phenols, solutions of phenylmercuric compounds, and combinations of phenylmercuric compounds and alkali metal salts of chlorinated phenols are presented. These include applications by addition to the beater, coatings, or calender solutions. Recommendations are also given for the collection and identification of paper and paperboard samples. E.S.

DRYING—PAPER

YOUNG, G. HAROLD. Paper drying on the machine. Paper Mill News 72, no. 30: 34, 36, 38, 40 (July 23, 1949).

When the stock enters the headbox of a paper machine at a consistency of ½ of 1%, for each ton of dry fiber, there are approximately 398,000 pounds of water present. Using this figure as a basis or 100%, 97.9% of the water is drained on the wire or 390,000 lb./ton. The cost of this removal is practically nil, because it is by natural drainage. The presses remove 0.83% or 3334 lb./ton, at which stage water removal is beginning to cost in the form of power applied to suction pumps and presses. The drier part removes only 1.17% of the original water in the sheet or about 4564 lb./ton. However, this seemingly minor portion of water represents the greatest cost in the operation of the machine. The author reviews briefly the development of the drier section and discusses typical present-day arrangements, including three-deck driers, driers arranged in vertical stacks, the single Yankee drier, and combinations of predriers with a Yankee drier. The phenomena taking place inside the individual drier are outlined, such as heat transfer,

condensation of water and gases, drier drainage, and their effect on drying rate. Moisture curves are given which illustrate the rate of water removal from the web as it progresses through the section. The sheet actually passes through three stages: the preheating, evaporating, and final drying stages. For obtaining efficient drier operation, emphasis must be placed on the three main factors: initial moisture content of the sheet entering the driers, steam pressure, and surface contact. E.S.

ELECTRIC PRECIPITATORS

HAND, C. E. Some aspects of Cottrell precipitator operation in the kraft industry. Pulp Paper Mag. Can. 50, no. 7: 103-6 (June, 1949).

After a brief description of the unusual features of the Bloedel, Stewart & Welch precipitator at Port Alberni, one of the most recent Cottrell precipitator installations in the West, a summary of the experience gained to date is given. The operation of the mill was very erratic after the initial start-up and steady operation periods greater than a month did not occur for nearly a year. These conditions are not favorable to good precipitator operation and the direct reason for certain troubles which were encountered. Insulation and electrode-rod breakage, corrosion, bridging of chemicals, radio interference, breakdown of high-voltage cables, etc., are discussed. The outstanding features which would bear improvement include a different damper construction, high-voltage cable protection with high-frequency suppressors at the treater ends, and either steel walls for the treaters or grounded heavy wire netting embedded in the concrete to shield against radio interference. Coating with Heresite against corrosion has given gratifying results. In colder climates, insulation is significant. In spite of certain difficulties, the unit has performed satisfactorily. E.S.

ELECTRONICS

GEE, C. C. Electronic control in processing and packaging consumer products. Parts I and II. Brit. Packer 11, no. 6: 22-5; no. 7: 22-5 (June, July, 1949).

Following an enumeration of the principal advantages of electronic measuring and control devices, the author initially discusses pH and temperature measurement and control, purity maintenance, conductometric methods of measurement, the testing of liquids, potentiometric titration, moisture determination, the investigation of dielectric properties, pressure, flow, and level control, the determination of moisture in timber, and the conveying of measurements to recorders. Part II includes a consideration of electrophotometric color measurement, positive weight control of packaged products, viscosity measurement and control, position and register control, maintenance of paper-web position, process control, the operating principle of pertinent control equipment, the counting and batching of small objects, and the automatic removal of discolored objects. 12 figures and 18 references. R.R.

FERMENTATION PROCESS

ENEBO, LENNART. Symbiosis in thermophilic cellulose fermentation. Nature 163, no. 4151: 805 (May 21, 1949).

From an elective culture of anaerobic thermophilic bacteria three different bacteria were isolated, only one of which was capable of fermenting cellulose. When the cellulose medium was inoculated with combinations of the cellulose-fermenting and the two noncellulose-fermenting bacteria, the fermentation

time was considerably shortened. It was also found that the production of butyric acid increased during the symbiotic relationship. However, the production of lactic acid decreases, as the amount of butyric acid increases, which indicates that butyric acid formation is in some way connected with lactic acid formation. B.F.S.

FIBER—TESTING

REICHARDT, C. H., SCHAEVITZ, H., and DILLON, J. H. Stress-strain-time apparatus for fiber testing. Rev. Sci. Instruments 20, no. 7: 509-16 (July, 1949); *cf.* B.I.P.C. 13: 470.

A stress-strain apparatus for testing individual fibers is described. The apparatus employs a ring dynamometer in conjunction with a linear variable differential transformer. A constant rate of elongation apparatus is fully described and a schematic diagram of a constant rate of loading apparatus is discussed. The use of linear variable differential transformers allows simple a.c. amplifiers to be employed and thus removes many of the difficulties involved in d.c. bridge circuits. Load ranges from 1 to 50 grams per 10 chart inches can be obtained with a sensitivity of several milligrams. By changing the size of the ring dynamometer, an apparatus giving the greater load ranges necessary to test yarns can be constructed. E.S.

FOLDING BOXES

ANON. Birds Eye goes automatic. Modern Packaging 22, no. 11: 92-4 (July, 1949).

The Birds Eye-Snider Division of the General Foods Corp. plans to use a one-piece, cellophane-lined, lock-tab folding carton on new automatic equipment for virtually all its operations. The carton is received as a scored blank to which a cellophane liner has been spot glued. Because they tend to block in storage, the blanks are hand fed to the forming machine, which sets up the cartons at a speed of 60/min. and puts them on a conveyor belt. An automatic closing machine folds the cellophane around the product and locks the cover in place at a rate of 120 cartons/min. A waxed-paper overwrap is finally applied and heat-sealed. The carton stock is a white coated manila-lined board, high-gloss paraffined outside and wax-impregnated inside. The new carton and packaging equipment result in a substantial saving of labor and reduction in the material costs and damaged cartons. The operation of the machinery is described and illustrated. R.R.

ANON. Dispensing package for labels. Modern Packaging 22, no. 11: 81, 208 (July, 1949).

A new type of label dispenser, Econo-Pak, facilitates prepackage labeling by hand, keeps labels clean, and minimizes waste. The basic unit is a paperboard folding carton holding 1000 labels printed with store identification, product designation, and ruled-off spaces for weight, price per pound, and total price. A die-cut opening in the top of the carton permits the label to be marked while still in the dispenser; the label is removed through a slit in the side of the carton top. The labels are held against the top of the box with a rubber band kept in place by slots in the sides of the carton. As the labels are used, the tension is maintained by pulling the rubber band through a second set of notches in the carton. Five rows of ten cartons are arranged in a shallow corrugated box, each row higher than the one in front of it, so that labels can be marked without removing the dispenser cartons from the box. R.R.

ANON. New carton "pairs-off" pillows. Am. Boxmaker 38, no. 7: 20 (July, 1949).

A pillow carton still being market-tested has one side panel with two extending locking tabs and the opposite side panel slotted to accommodate these tabs. When the cartons face together, the tabs on both sides lock into the matching slots, forming one package. For display purposes, the tabs on one side are locked and the cartons spread apart like an open book. The contents are visible through die-cut windows on the facing surfaces. Because the pillow is compressed in the carton, shelf space is saved. R.R.

LANGE, HILDRETH. We want packages that create the impulse to buy. Paper Sales 9, no. 7: 20, 32 (July, 1949).

The author deplores the sameness of most packages, a quality which does not invite the customer to investigate the contents and which retards decision at the point of sale. The ideal package should have consumer acceptance and be soundly designed, which includes eye appeal, originality, good composition, typography, and color, proper engineering, and salesmanship. Unit prepackaging is highly desirable to facilitate marking and order filling, prevent breakage and soiling, and shorten the time element at the point of sale. R.R.

FORESTS AND FORESTRY

ANON. Hybrid tree breeding. Fibre Containers 34, no. 7: 70-1 (July, 1949).

A history is given of the Institute of Forest Genetics, Placerville, Calif., and the work on pine being done there. It is believed that the research will result in hybrid forest trees which will grow to cutting size in half or a third the time taken by a good nonhybrid. R.R.

ANON. Mexican utilization program: Chihuahua pulp mill plan revived. Pulp & Paper 23, no. 8: 56, 58 (July, 1949).

The Union De Madereros De Chihuahua, Mexico, which includes every producer of forest products in the state, has undertaken a program of fire protection, better wood utilization, and the establishment of three tree nurseries in Chihuahua, one of the two richest Mexican states with regard to softwood forests. The union also has plans for building a pulp and paper mill. The development of the industry has been hindered by a lack of water at suitable mill sites. R.R.

HARRISON, J. B. D. Forestry in the changing world. Pulp Paper Mag. Can. 50, no. 7: 129-30, 132 (June, 1949).

The present timber shortages in North America, Europe, and the Soviet Union can be overcome with reasonably good management; in the Far and Middle East alleviation of the situation will be a long, costly process. About a third of the world's forests are nonproductive, leaving a productive forest area of about 6,500,000,000 acres, 2,300,000,000 being softwood. With proper management, the accessible softwood forests could yield over 40,000,000,000 cu. ft. of wood annually; softwood forests now inaccessible should produce an additional 20,000,000,000 cu. ft. It is estimated that the world's softwood forests could ultimately yield more wood than has ever been taken in a single year from both hard- and softwood forests. The work of the Division of Forestry and Forest Products of the Food and Agricultural Organization of the United Nations is described. R.R.

GUMS AND RESINS

HIRST, E. L. The occurrence and significance of the pentose sugars in nature and their relationship to the hexoses. J. Chem. Soc.: 522-33 (February, 1949).

Consideration is given principally to the enantiomorphs of the pentoses which occur in nature and the types of natural products in which they are found. A table gives the carbohydrates which have been identified in the gums and mucilages. The structures involved have been determined, in part, by the hydrolysis of the methylated products and the identification of the methylated carbohydrates. 33 references. C.J.W.

HISTORY

ANON. Paper makers' patron saint. World's Paper Trade Rev. 131, no. 24: 1574, 1576 (June 16, 1949).

Reference is made to a stained glass window, which has been placed in the church at Docelles, Vosges, France, and which is dedicated to St. Anthony, long considered the patron saint of papermakers who in that district have engaged in papermaking since the middle of the 15th century. Why St. Anthony was chosen as the patron saint of papermakers is obscure, although in old correspondence frequent allusions are found to the Festival of St. Anthony, celebrated by papermakers on January 17. The present window—a replacement of one destroyed during the war—shows the figure of the saint in the center, surrounded by important scenes in the history of papermaking and interspersed with watermarks of the locality and its surroundings. The stained window, which is reproduced in black-and-white, is believed to be the only one of its kind in existence. E.S.

INSECTS AND VERMIN

DEGRYSE, J. J. Forestry insect control. Pulp Paper Mag. Can. 50, no. 7: 134, 136 (June, 1949).

The forest entomologist must keep in mind the facts that he is working with a problem that will never be completely solved and that he should look for future possibilities rather than immediate results. The propagation and distribution of parasites which may help to control harmful insects is a long-term problem and should be continuous. A description is given of the unique laboratory for the propagation of insect diseases which is under construction at Sault Ste. Marie, Ontario. R.R.

INSTRUMENTATION

YUNKER, W. S. Getting the dollar value from your instruments. Paper Trade J. 129, no. 1: 29-32 (July 7, 1949).

Any instrumentation program should be based on four very fundamental factors: sound application engineering, selection of proper instruments, careful installation, and good maintenance. In making the selection, the original cost of the instrument and the ease or difficulty and cost of installation and maintenance should be evaluated and the instrument be judged carefully on these points. The application of these principles is illustrated by typical examples. E.S.

INTERIOR PACKING

ANON. Low-cost safety for ampoules. Modern Packaging 22, no. 11: 78-80 (July, 1949).

Winthrop-Stearns, Inc., Rensselaer, N.Y., is the first company in this country to adopt a simple method of packing ampoules safely against breakage which is much used in Switzerland, where it is called the Rondo. The tray in which the ampoules nest is like a strip of single-face corrugated board, except that the corrugations are especially full and tightly bunched and made of paperboard sufficiently strong to have some resiliency. The corrugation groove is shaped like a well-rounded C. When an ampoule is placed in the groove, it is held as by a spring clip. The corrugations are

made wider than the length of the ampoule to provide cushioning air spaces above and below the glass. The flat base to which the corrugation is glued at each segment is wide enough to be folded over the ampoules to form a rigid tray which slides easily into an ordinary tuck-end folding carton. An ampoule held in a single segment of the tray cannot roll off a desk or counter. The tray can be subdivided easily by cutting through it, which saves the physician's time in unpacking from the individual folding carton previously used. A great reduction in packing costs has been effected, even though the work is still done by hand. R.R.

KOTTE, HANS. Corrugated board cuts for interior packaging. Allg. Papier-Rundschau no. 2: 60-2 (May 15, 1949). [In German]

The article is based on the discussion by Walter Stern in his "Packaging engineering handbook," published serially in *Fibre Containers;* this particular section appeared in the December, 1947, issue (*cf.* B.I.P.C. 19:193-4). E.S.

LIBRARIES

JENSEN, WALDEMAR. Technical publications and their use in industry. Finnish Paper Timber J. 28, no. 14: 188-92 (July 30, 1946). [In Swedish; English summary]

The author emphasizes the value of technical literature to an efficient organization and gives a brief outline for a simple library service which even smaller mills can afford. E.S.

LIGNIN

GAGNON, PAUL E., and BOIVIN, JEAN L. Ion-exchanging lignin resins. Pulp Paper Mag. Can. 50, no. 7: 92 (June, 1949).

The following data from the literature are given: Sulfonated lignin from sulfite waste liquor has an ion-exchange capacity of 19.2 milli-equivalents/100 g. of material, which increases to 33.0 on treatment with 0.1 *N* sodium hydroxide. Alkali lignin from soda waste liquor has an exchange power of 9.8 in neutral solution and 13 times this value in alkaline solution. Base-exchange resins have been prepared from lignosulfonic acids and a base-exchange material suitable for use as a molded plastic was obtained by condensing resorcinol, phenol-sulfonic acid, or salicylic acid with formaldehyde and lignosulfonic acid or its alkali salts. Addition complexes of alkali lignin and protein have great base-exchange capacity which increases as the proportion of protein to lignin rises. R.R.

JONES, EDWARD J., JR. The ultraviolet absorption spectra of complex hydroxyaromatic compounds and derivatives, with particular reference to lignin. Tappi 32, no. 7: 311-15 (July, 1949).

A review is given of the ultraviolet absorption spectra of lignin and of pure compounds which might be considered as progenitors of lignin. 26 references. E.S.

LOADING AND UNLOADING—CARS

HASTINGS, EDWIN CHESTER. Demurrage. Paper Trade J. 129, no. 3: 50-2 (July 21, 1949).

Demurrage is a term used by the rail carriers to cover penalty charges assessed on cars that are not released within the time allowed for loading and unloading. The shipper has two days' free time after actual placement

on the siding where the carrier spots the car for loading. Most cars are spotted at night, the free time (usually) beginning at the first 7 a.m. after placement. If the car is not loaded within the 48-hour free period, demurrage accrues with increasing rates on the following days. Demurrage is covered by either the Straight Plan or the Average Agreement. Under the Straight Plan, no credits are given for any unused portion of the free time, whereas the carrier collects for all time over the free period. Under an Average Agreement, cars released within the period of free time are credited and the credits earned are used to offset debits on a monthly basis. On Sept. 1, 1949, demurrage rates will be increased. In conclusion, the special provisions of demurrage strike rates are explained; these hold, provided that the plant tied up by labor trouble advises the carrier in writing at once. E.S.

LUBRICATION AND LUBRICANTS

LARINKARI, J. Improving the quality of lubricating oil from wood tar. Finnish Paper Timber J. 28, no. 2: 30-2 (Jan. 31, 1946). [In Finnish; English summary]

The lubricating oil manufactured from Finnish pinewood stump tar is characterized by a low resistance to heat and oxidation. When mixed with lubricating oils of mineral origin, the properties of the resulting mixtures vary in proportion to the quantities of wood-tar lubricating oils which have been added. Many different attempts have been made to improve the quality of this oil, but without practical results. The increase in the neutralization value normally accompanying oxidation can be prevented by extraction with alcoholic alkali, and the amount of sludge formed on oxidation can be reduced by treatment with maleic anhydride. However, these treatments do not raise the viscosity pole height. It is possible to obtain a product comparable to transformer oil by fractional distillation of wood-tar lubricating oil. E.S.

THE TEXAS COMPANY. Lubricating the modern paper machine. Lubrication 35, no. 7: 73-84 (July, 1949); Paper Mill News 73, no. 34: 42, 44, 46, 48, 52, 54, 56, 58 (Aug. 20, 1949); *cf.* B.I.P.C. 17: 18.

Following a brief outline of the flow of pulp on a Fourdrinier and cylinder machine, the lubrication of the wet and dry ends, calender stack, and drives is discussed, including types of bearing, grease and oil characteristics, and contamination, application, and maintenance of circulation of lubricants. 7 figures. E.S.

MACHINERY

ANON. New Beloit machine improvements. Paper Mill News 72, no. 30: 70-1 (July 23, 1949).

Among the design improvements made on Beloit equipment last year are the application of air-loading diaphragms to paper-machine pressure devices, mechanical paper-machine drives, a hypoid drier drive gear unit arranged for flat belt transmission, open-side calenders, a revolving cutter bar carrying two knives on single station cutters, and new features on winders. Illustrations are included. R.R.

LINDBLAD, ROLF. Developments in the paper industry. Finnish Paper Timber J. 28, no. 3: 47-8, 50-2 (Feb. 15, 1946). [In Swedish; English summary]

The author discusses several recent developments, chiefly of German origin, including the Steinbock-Roth waste-paper stamper, a pulper constructed by Maskin och Bro division of the Wärtsilä organization, a continu-

ous jordan by Voith and continuous stock preparation in general, the Voith high-pressure inlet, improvements in the control of pressure on the presses in the paper machine, Bong's patented strip drier felt, and a new winder type (Ultra-Roller) by Goebel. E.S.

MACHINERY—BEATERS

TEMPERLEY. Mechanical filling of beaters. Paper-Maker (London) 117, no. 5: 339-40 (May, 1949).

The installation and advantages of a pneumatic blowing and a pumping system for the rapid charging of beaters from the stuff chests are described. With the pumping system, the stock can be handled at 4% consistency and kept in constant circulation; however, the pump must operate continuously, using about 45 h.p. It requires about 5 minutes to fill a 1000-pound beater. With the blowing system, circulation is not possible, but the stock can be blown at heavier consistencies up to 7%, and the power demand reduced to 27 h.p. when the compressor is used during the blowing operation only. A half-ton beater is filled in about 2-3 minutes, requiring 2½ blows. E.S.

MACHINERY—BOARD MACHINES

ANON. Sutherland's new board machine starts running. Paper Mill News 72, no. 31: 8-10 (July 30, 1949); Paper Ind. 31, no. 5: 562-4 (August, 1949).

The new eight-cylinder board machine of the Sutherland Paper Co., Kalamazoo, Mich., began operation at half speed on July 20, 1949. An illustrated description is given of the new equipment and building in which it is located. R.R.

ANON. World's longest paper machine at new Michigan Carton mill. Paper Mill News 72, no. 30: 46 (July 23, 1949); *cf.* B.I.P.C. 19: 382.

A description is given of The Angel, new 140-inch eight-cylinder paperboard machine at the Battle Creek, Mich., mill of the Michigan Carton Co. R.R.

MACHINERY—CALENDERS

ANON. The Neely threader for calender rolls. Svensk Pappers-tidn. 52, no. 10: 272 (May 31, 1949). [In Swedish] *cf.* B.I.P.C. 18: 374-5.

An illustrated description of the Neely threader, a safety device for feeding the paper web through calender rolls, is given. E.S.

THOMAS, E. E. The modern supercalender. Paper Mills News 72, no. 30: 80, 82, 97 (July 23, 1949); Paper Trade J. 129, no. 6: 41-3 (Aug. 11, 1949); *cf.* B.I.P.C. 19: 92.

The modern supercalender must require a minimum of operating and maintenance attention, minimize down time, and be sufficiently massive to eliminate distortion and insure against mechanical breakdown. The framework, rolls, bearings, lubrication, nip pressure loading system, oil hydraulic pressure system, auxiliary equipment, wind and unwind equipment, and electric tension control are discussed. R.R.

MACHINERY—CONVERTING MACHINERY

KOTTE [H.] Recent developments in American converting machinery. Allg. Papier-Rundschau no. 3: 118-20 (May 31, 1949). [In German]

Reference is made to a number of new converting machines, which illustrate the general trend toward mechanization and reduction or elimination of expensive manpower. Examples include machinery for making drinking cups, transparent containers, setup and folding boxes, and a new draw press for producing small round plastic containers. E.S.

MACHINERY—DRIVE, ELECTRIC

ANON. Paper machine drive improvements. Paper Mill News 72, no. 30: 74, 76, 78 (July 23, 1949).

In the Reliance sectional paper machine drive both mechanical and electronic elements combine to provide and maintain desired intersection speed relationships, proper linear machine speed, and steady operation. Features of the system are described and illustrated. R.R.

SHIPSTONE, B. A. Electronics and the paper machine drive. World's Paper Trade Rev. 131, no. 25: Tech. Sup. 46-52 (June 23, 1949).

Reference is made to early paper-machine drives, including mechanical, electrical, and true sectional electrical drives, the demand for higher machine speeds, the application of the electronic valve to the control of the paper-machine drive, its limitations, and precautions required in its operation. Different control circuits are discussed, including single-generator, multiple-generator, and rectifier-supply units. The initial outlay for any of the modern drives on a present-day cost basis is approximately the same; the electronically controlled drive will offer advantages through greatly improved stability of operation, resulting in higher output and efficiency, with fewer maintenance problems. 9 diagrams. E.S.

MACHINERY—DRYERS

MILNES, ALBERT. The effect of condensate and air on output, quality and steam consumption of paper machine dryers. Paper Trade J. 129, no. 3: 37-41 (July 21, 1949).

The papermaker is interested mainly in the surface temperature of the rolls which contact the sheet. To get maximum output, he must raise the temperature as rapidly as the sheet will allow and carry on the drying process at the highest permissible roll-surface temperature. The machine must be supplied with steam at the necessary pressure and as nearly dry-saturated as possible. The drier part should not be treated as one unit. An efficient individual roll-drainage and air-venting system must provide simple manual or automatic temperature and pressure control. When starting up and during operation, air and any accumulating gases must be removed continuously; the same applies to discharging condensate as quickly as it forms and under all pressure conditions. If wet-end rolls must run at below-atmospheric pressures, the remaining rolls must be able to supply flash steam for this purpose; a vacuum pump should handle air from these rolls only. Installation and maintenance costs of these units should be low. Different arrangements, including stage heating and steam-lock release valves, are discussed. Maintenance of correct surface temperatures on drier rolls is not the only factor, because contact of the sheet with the roll, length of draw, felt condition, and surrounding-air temperature and humidity also exert an influence. However, individual roll control and the ability to vary the temperature, without introducing complications in the remainder of the machine, will increase the mean efficiency of the entire drier unit. 12 diagrams. E.S.

VAN KAMPEN, G. R. Gas burners installed for increased drying capacity. Paper Mill News 72, no. 30: 64, 75 (July 23, 1949); *cf.* B.I.P.C. 19: 634.

A radiant burner can be considered to have the drying capacity of 1½ driers. The heat is applied to the exposed surface of the wet paper where evaporation actually occurs. The unrestricted evaporation makes possible the use of high temperatures without raising the temperature of the paper to the danger point. With coatings, the burners not only increase drying speeds, but also set the coatings before contact with the driers. Portable equipment permits small scale tests which are recommended for unusual jobs. Burner controls and safeguards for emergencies are described. R.R.

MACHINERY—ELECTRIC EQUIPMENT

HALL, WILLIAM G. Downtime reduced through stocking motor renewal parts. Paper Ind. 31, no. 4: 465-8 (July, 1949).

The advantages of a sound replacement program based on the individual mill's requirements are outlined. No hard or fast rules can be made covering the particular types or specific quantities of parts that should be carried in stock. The problem is basically one of weighing the cost of stocking repair parts against the loss incurred through possible downtime equipment. Corrosion, abrasive dust, and high room temperature are the atmospheric conditions which contribute to motor failure. In addition, overloading, excessive starting and stopping, and lack of a regular maintenance schedule will shorten motor life. Windings and moving parts subject to wear require replacement more frequently than other components. Downtime is usually restricted to a minimum when a complete motor is available for replacement the moment trouble occurs. In some mills, a continuous replacement cycle may be practicable. In conclusion, the correct protective packaging of parts for storage is outlined. E.S.

MACHINERY—PACKAGING MACHINERY

ANON. Automatic enveloper. Modern Packaging 22, no. 11: 134-5 (July, 1949).

The operation of a simple machine is described which, in one continuous operation, makes envelopes from foil-laminate roll stock, fills, heat seals, and moves them to the packer. At present the unit is being used to package a powdered product at a speed of 50 envelopes per minute. R.R.

ANON. Cracker wrappers. Modern Packaging 22, no. 11: 87-9, 219-20 (July, 1949).

Machines now available wrap cracker sandwiches in unsupported cellophane, heat seal the wrap, and apply and seal small spot labels on one or two sides of the package. They adjust to the dimensional variations of the product being wrapped, producing an average 60 packages/min. In a typical installation, one machine with three attendants replaces 10 girls wrapping by hand. The wrapper saves 15-20% in the cellophane used, makes a neater, tighter, and more uniform package, and results in extra days of freshness for the sandwich because of the moistureproof package. An illustrated description is given of the operation of the equipment. R.R.

MACHINERY—PAPER MACHINE

ANON. New Powell River No. 8 machine. Paper Mill News 72, no. 30: 52 (July 23, 1949); *cf.* B.I.P.C. 19: 635.

A description is given of the new newsprint machine at Powell River, which has attained a speed of 1600 ft./min. R.R.

ANON. New Rhinelander machine making glassine paper record. Paper Mill News 72, no. 30: 44 (July 23, 1949).

The "Ripco Maid," newest glassine and greaseproof Beloit Fourdrinier at the Rhinelander Paper Co., Rhinelander, Wis., is described. It is 182 inches wide, trims approximately 160 inches, and has a double set of suction-roll presses for improving the quality and quantity of the product. The three or four hours' tune up and adjustment which were necessary before merchantable glassine was produced are a record for a machine of this size. R.R.

CURRIE, H. Some factors in speed development in the manufacture of medium fine papers. Paper-Maker (London) 117, no. 5: 333-4 (May, 1949).

The author describes the speeding up of an old paper machine for medium-fine papers which was built 50 years ago for a maximum speed of 250 ft./min. in a building which excluded the removal of walls or the raising of the roof for gaining additional space. The installation of a suction couch and suction press hastened water removal from the well-beaten and hydrated stock. The efficiency of the drier section was improved by subdivision into smaller nests and adoption of gearless driers, elevated to give longer draws and to simplify the application of hot air. The gearless driers with A.F. bearings were also selected to reduce vibration and torque factors as much as possible and not exclusively to improve the efficiency of the section. E.S.

MACHINERY—SCREENS

EDWARDS, J. Sulphite screening. Pulp Paper Mag. Can. 50, no. 7: 111-12 (June, 1949).

In all types of screening equipment, the principle is the same: the undesirable particles are accepted or rejected on the basis of size only and the completeness of removal depends mainly on the perforations (slot size) of the screen plate used. Rejection is controlled by feed consistency and volume and pressure of shower water. The advantages and drawbacks of the Jonsson screen as a knotter, washing, riffling, and various types of fine screens (flat and rotary) are discussed. Data on the use of a Cowan screen are given which compared favorably with those from a Quiller screen. E.S.

FRASER, R. L. Sulphite screening at St. Anne. Pulp Paper Mag. Can. 50, no. 7: 112-14 (June, 1949).

Data are given on sulfite screening tests using a combination of Jonsson knotter and Cowan screen. The best compromise of cleanliness, adequate tonnage of screened stock, low power consumption, and low fiber losses in the rejected stock was found in the consistency range of about 0.48 to 0.55%. E.S.

MACHINERY—SUCTION ROLLS

HEYS, R. C. Some notes on the operation of suction rolls. Paper-Maker (London) 117: 34-6, 38-48 (Mid-summer, 1949).

The difference in the design and operation of suction couch and suction press rolls is described. The suction couch roll removes water from a

sheet of paper by the pressure difference established by the vacuum pump in the internal box within the suction couch cell and the atmospheric pressure on the top of the sheet. The quantity of water extracted from a sheet of paper passing over the vacuum area depends on the weight and porosity of the sheet being manufactured. The theory of operation, elements of design, different constructions, practical considerations in the application, and advantages and disadvantages of suction couch rolls are discussed in some detail. The suction press operates essentially as a plain press; the extraction of water is radically different from that at the suction couch roll, in that water is first pressed out by the top roll and only a small amount removed from the sheet of paper can be attributed to the vacuum pressure. The suction box performs the following important functions: it removes the water pressed from the sheet; prevents air from being trapped between felt and paper, which causes blowing; and conditions the felt. The choice of a suction-press felt must usually be a compromise between felt marking, shadow marking, and water-removal properties. Directions for obtaining optimum operating conditions are given, with special reference to the importance of felt cleaning and the suitability of the Vickery felt conditioner. Different constructions and press arrangements of suction presses are outlined. Throughout the article, numerous illustrations supplement the text and special consideration is given to Millspaugh equipment. 40 figures. E.S.

NASH, JOHN P. Elimination of suction roll noise. Tappi 32, no. 7: 293-7 (July, 1949).

The combined efforts of the Kimberly-Clark Corp. and the Beloit Iron Works have resulted in a workable silencer for suction rolls. This silencer, invented in 1937 by E. J. Abbott and J. D. Kraus, provides an air gap on the leaving edge of the suction box so that air must enter the evacuated holes of the shell slowly, the pressure wave which causes the noise in unsilenced rolls being thereby eliminated. It was long thought that this silencer was impractical for continuous mill operation, but further investigation has revealed that it can be installed successfully in the suction rolls of creped wadding machines. Installations have been made with excellent success on eight Kimberly-Clark creped wadding machines, loudness reductions of more than 80% being obtained on some rolls, and it is believed that similar results can be achieved on paper machines. E.S.

MACHINERY—WIRES

PATON, A. W. Manufacture of paper machine wires for Fourdriniers and cylinder mould covers. World's Paper Trade Rev. 131, no. 25: Tech. Sup. 41-6 (June 23, 1949).

The drawing, annealing, weaving, seaming, and finishing of nonferrous metals for the manufacture of paper-machine wires for Fourdriniers or cylinder-mold covers are described in some detail. 9 illustrations. E.S.

WRIGHT. Some recent advances in machine wire maintenance and repair. Paper-Maker (London) 117, no. 5: 334, 336-7 (May, 1949).

After briefly referring to the importance of dirt removal from the stock prior to its admission to the paper machine, the author discusses the operation of the different wet-end machinery parts in contact with the Fourdrinier wire, whose adjustment may exert a favorable or destructive influence upon wire life. Cleaning solutions and the electric patch welder are also considered. E.S.

MARKET RESEARCH

ANON. New data on prepackaging. Packaging Parade 17, no. 198: 40-1, 43 (July, 1949); Modern Packaging 22, no. 11: 102-3 (July, 1949); *cf.* B.I.P.C. 19: 771.

A study recently completed by the Florida Agricultural Experiment Station and the U. S. Department of Agriculture shows that the gross return for prepackaged sweet corn was approximately the same as for bulk corn. However, the by-product value of the husks and trimmings, used as fertilizer, and the value of the defective ears, used as cattle feed, are expected to favor prepackaging. The corn was husked by machine, trimmed, hydrocooled, packed in Kliklok trays, and overwrapped in Du Pont 300-gage MSAT-86 Cellophane. Data for the study were gathered from answers to postcard questionnaires placed in 50,000 packages. Good flavor, easy preparation, visibility, conveniences of prepackaging, no waste, and cleanliness were given as reasons for liking the prepackaged corn. A definite relationship was found between the length of time for distribution and the complaints received. The package, holding 15 inches of edible corn, was declared a satisfactory size in about two thirds of the replies. Packaging and distribution costs are discussed. R.R.

MARKING OF SHIPMENTS

MARSH, E. J. Technique of marking shipments. Paper Ind. 31, no. 4: 508-9 (July, 1949).

Shipments may be marked by stencils, printing, stamping, or writing. The importance of plain and durable marking is emphasized, considering the fact that 12 million dollars are lost each year because of failure to mark shipments properly. The tools for stencil marking are the stencil, the brush, and the ink. For marking absorbent surfaces, such as paper cartons, an ink which dries by absorption into the surface of the container is used. Stencils can be used several thousand times; they should be saved and stored according to a good filing system. E.S.

MATERIALS HANDLING

CARNEY, C. J., JR. Current trends in packaging and materials handling. Fibre Containers 34, no. 7: 90, 92 (July, 1949).

The importance to industry of materials handling and the benefits involved are discussed. In time, labor will consider modern materials-handling methods and equipment a job prerequisite and will promote modern techniques. Special-order equipment will become more important with the increase of competition. A compromise between carriers and shippers on the acceptance of palletized goods for carload freight delivery is possible within the next year. Trends in packaging include the use of a variety of materials to do a better job than is possible with one, outside independent laboratories to check or pretest designs, extra-strength designs, more cushioning materials for protection, corrosion-preventive papers and coatings, and protective films, foils, and papers in the food and drug fields. R.R.

METERS AND RECORDERS

ROBERTS, C. C., and VOGELSANG, C. A. Thermoelectric pyrometry. Paper Ind. 31, no. 4: 459-60, 463 (July, 1949).

Certain fundamental electrical aspects of thermoelectric pyrometry are discussed, including the electromotive force resulting from the Peltier and Thomson effects, the law of intermediate temperatures, and the law of

intermediate metals. Their practical application to differential and average measurements by thermocouples is described. E.S.

MICROBIOLOGICAL TESTING

STEFFENS, H. G. Quick test for fungus resistance. Modern Packaging 22, no. 11: 168-9 (July, 1949).

A procedure is given for testing the fungus resistance of packaging material, which is relatively simple and requires only one week to complete. A modified Sauboraud medium is used for the culture of *Aspergillus niger*. The specimen to be tested is placed directly on the inoculated agar surface and 0.2 cc. of spore suspension is spread over the surface of the specimen. Incubation is carried on at 85-90° F. and 96-100% R.H. in the dark for seven days. The fungus resistance is rated according to a given schedule. Photographs show typical rated results. The procedure can be expanded by the use of mixed spore suspensions. R.R.

MILL MANAGEMENT

IRMITER, RICHARD. Maintenance in plant washrooms. Paper Ind. 31, no. 4: 461-3 (July, 1949).

A definite program for the cleaning and maintenance of each industrial washroom should be established to keep the sanitary plumbing equipment in good working order at all times. Directions for the treatment of faucets, drains, sinks, drinking fountains, the selection of cleansing agents, etc., are given. A planned cleanliness program engenders a greater feeling of respect for the equipment among users. E.S.

KUEBLER, J. W. Foremen's contest improves operation. Paper Ind. 31, no. 4: 464, 468 (July, 1949).

An annual contest for bettering various managerial functions among supervisors and foremen in the Easton, Pa., plant of the Dixie Cup Co. is described. The contest is run in two divisions, one for direct manufacturing departments and one for major indirect departments and is based on ratings in the following eight subjects: housekeeping, safety, new ideas, customer complaints, turnover control, waste, production, and costs. Each contest runs from February through November and awards are made at the annual foremen's Christmas party. The ratings are based on standards determined at the start; the scoring factors for each subject in the two groups are explained. Increased efficiency, better supervision, and a reduction in cost have resulted from these contests; the major problem of keeping foremen continually well informed has been successfully solved in this manner. E.S.

MILLER, LAWRENCE. Materials, methods and men. Pulp & Paper 23, no. 8: 67 (July, 1949).

Both materials and methods in industry are relatively well developed, with most of the pioneer work still to be done in the field of manpower. The author considers the ways in which personnel departments can help to develop the field and reviews the methods used by a Pacific Coast mill to secure good employee relations. The article won the 1949 Cunningham Award. R.R.

MOLDS

APPLING, JOHN W., BUCKMAN, STANLEY J., and MEALS, ROBERT N. A mold with a high resistance to organomercurials, *Penicillium roqueforti* Thom. Tappi 32, no. 7: 300-2 (July, 1949).

The only surviving mold in groundwood pulp treated with phenylmercuric acetate was identified as *Penicillium roqueforti* Thom. It is suggested that this mold may be a fairly common one in Scandinavian pulp mills and also that it may be one of the unidentified species of *Penicillium* frequently observed in pulp and slime samples of the United States and Canada. The inhibiting concentration of phenylmercuric acetate in malt agar was about 8 p.p.m. for this mold, a value about four times that obtained for *Aspergillus niger*. For sodium pentachlorophenate in malt agar, the inhibiting concentration was about 40 to 60% less than for *A. niger*. The growth pattern below the inhibiting concentration was normal for the second toxicant but abnormal for phenylmercuric acetate. Chemical analyses of uninoculated controls of groundwood pulp mats with and without added nutrients were compared with those of similar mats which had been subjected during nine weeks to the action of *P. roqueforti*. Changes were of such small magnitude, even in the presence of added nutrients which greatly stimulated growth, that it was concluded they would not measurably affect the usefulness of the pulp.

E.S.

PAPER—COATED

ERICKSON, D. ROBERT. Hydroxy ethyl cellulose in paper coating; a new coating process. Tappi 32, no. 7: 289-91 (July, 1949); *cf.* B.I.P.C. 19: 708.

Essentially the same description is given as in the previous reference.

E.S.

FROST, F. H. A new principle in lithographic paper manufacturing. Modern Lithography 17, no. 7: 59-62 (July, 1949).

The author suggests a hypothesis regarding the basic relationships between offset lithography and the paper used in that process, building up his theory step by step and describing tests made to check these points. He has produced a double-coated paper which is absorbent to ink and relatively nonabsorbent to water. Test runs gave exceptionally good reproductions and the new surface so minimized offsetting that speeds of 6000 ft./hr. with full color were successfully made. The fountain-solution requirement was at least as low as that for a standard uncoated offset paper and the ink requirement was normal to less than normal. There was no delivery-end curl. In addition to this ink-water receptivity, good lithographic papers must obviously possess other basic features, such as a high fiber-bonding strength, stability to humidity changes, and strength and smoothness of fold.

R.R.

PAPER—SHEET FORMATION

PELLINEN, HEIKKI. Variations in sheet formation and look-through in the preparation of test sheets. Finnish Paper Timber J. 28, no. 16: 244-8, 250 (Aug. 31, 1946). [In Finnish; English summary]

Although the Lampén or Keskuslaboratorio paper sheet mold (I) differs considerably in its construction from a paper machine, short-fibered groundwood pulps or well-beaten stocks give homogeneous sheets of good formation, and long-fibered sulfite or kraft pulps, papers of poor formation on both machines. The quality of formation or "look-through," however, is a relative concept. The manufacture of fine papers requires formations which range to complete homogeneity; in most cases these requirements can be met. In the manufacture of kraft or sulfite wrapping paper, the formation is usually cloudy. (I) is generally charged with a pulp consistency of 0.375 or 0.25 g./liter; the latter concentration, particularly with chemical pulp, results in test sheets of uniform formation. Lowering the temperature and

increasing the dilution of the stock will improve the formation in (I); in the second case, test sheets made from long-fibered pulps may show an increase of from 5 to 10% in breaking length. On the other hand, very highly beaten stocks (glassine) give sheets of inferior formation, because of the long drainage time required on the sheet mold. During this period the fibers settle and flocculate in the mixing box of (I); the flocculation is particularly noticeable in the range from 0.5 to 0.2 g./liter. The fiber bundles or flocs settle approximately 10 times as rapidly as individual fibers. The formation of flocs may be retarded by increasing the dilution; however, this increase must be greater than 15,000 times before the fibers may be kept in suspension for any length of time. The literature does not indicate the extent to which certain hydrophilic colloids, such as locust bean gum—which are capable of retarding flocculation—are used commercially for improving the formation of paper sheets. E.S.

PAPER AND PULP INDUSTRY

AANENSEN. The Norwegian paper trade in 1948. Paper-Maker (London) 117, no. 5: 345-6 (May, 1949).

Conditions and important events in the Norwegian paper industry during 1948 are reviewed. Although on the whole it was a satisfactory year, the reversion to a buyer's market, exchange difficulties, possible price reductions, and hesitance on the part of buyers to place any substantial business make the outlook not too bright. E.S.

BRAND, O. W. Shall the wood-conversion industry be located near the coast? BERGLI, SVERRE L. Shall the wood-conversion industry be located inland? Norsk Skogind. 3, no. 5: 117-23; discussion: 123-6 (May, 1949). [In Norwegian]

The first of the two authors outlines the advantages for additional Norwegian wood-conversion plants situated near the coast, and the second cites the points in favor of an inland location; a general discussion follows. E.S.

COOPER, PAUL E. The pulp and paper industry in British Columbia, its immediate problems and its future. Pulp Paper Mag. Can. 50, no. 7: 100-2 (June, 1949).

The problems of varied and stiffer foreign competition in the industry, increasing costs, and decreasing demand for finished products must generally be met by improved merchandising, intensive selling, research, better products, and increased plant efficiency. The author believes that the forest legislation of British Columbia, resulting from the Sloan Report, can be improved by including some of the factors involved in the successful Tree Farm movement, particularly ownership. The rapid expansion of the industry in the province, where recent plant construction has totaled about $82,000,000, will probably be checked by the general buyer resistance. R.R.

PHILLIPS, H. G. Impressions of a recent visit to Sweden. Paper-Maker (London) 117: 5-14 (Mid-summer, 1949).

The editor of the *Paper-Maker and British Paper Trade Journal* describes a recent trip to Sweden where he spent two weeks visiting a number of outstanding pulp and paper mills, the paper mill engineering firm, Karlstads Mekaniska Werkstad, the Swedish Wood Research Institute at Stockholm, and a small board mill specializing in leatherboards. E.S.

TÖRNQVIST, LEO. A forecast for the paper export from Finland during the period 1950-2020, based upon a study of the development during the years 1874-1945. Finnish Paper Timber J. 28, no. 22: 351-4 (Nov. 31, 1946). [In Swedish]

In an economic study, the author traces the development of the Finnish paper export (exclusive of paper products, chemical or mechanical pulp, and board) from 1874 to 1945 and illustrates his data by a trend curve with a long upward drift, broken only by the two conspicuous drops during the two world wars (from 159 million kg. in 1916 to 24 million kg. in 1918, and from 536 million kg. in 1939 to 96 million kg. in 1940). Continuing this upward trend, the author predicts an increase from 378 million kg. in 1950 to 1050 million kg. in 2020, when taking a pessimistic outlook; the probable development will be a rise from 419 million kg. in 1950 to 1940 million kg. in 2020, and a very optimistic forecast gives 464 million kg. in 1950 and 7740 million kg. in 2020. E.S.

PAPER AND PULP INDUSTRY—EDUCATION

SYME, T. D. Pulp and paper night school. Western Pulp and Paper 2, no. 7: 11-12 (July, 1949).

A description is given of the night-school course which was conducted during the winter of 1948-49 by the Ocean Falls Division, Pacific Coast Branch, Technical Section, Canadian Pulp and Paper Association. The lecturers and their subjects are listed. R.R.

PAPER AND PULP MILLS

ANON. Biggest news mill: how Three Rivers did it. Pulp & Paper 23, no. 8: 34-5, 37 (July, 1949).

Information is given regarding recent improvements at the Canadian International Paper newsprint mill at Three Rivers, Quebec. Without adding any papermaking equipment, the average daily production has been increased from 790 to 917 tons/day. R.R.

ANON. Ebasco designs first newsprint mill for India. Paper Mill News 72, no. 31: 11-12 (July 30, 1949); *cf.* B.I.P.C. 19: 569.

The design, construction, and procurement of the first Indian newsprint mill at Chandni, for National Newsprint and Papermills Ltd., are being supervised by Ebasco Services Inc., New York. Consideration is given to the construction and design, product, raw materials, chemical pulp production, and paper machine. R.R.

ANON. The Howard Smith Paper Mills and subsidiary companies expansion and modernization program. Pulp Paper Mag. Can. 50, no. 7: 79-82 (June, 1949).

An illustrated description is given of the improvements and additions made by the Howard Smith Paper Mills and its subsidiaries in its three-year program begun in 1947. The principal changes include an alkali-pulp chemical-recovery plant at the Cornwall Division and another at the Canada Paper Co., Windsor Mills, Quebec, each consisting of a 175-ton Tomlinson-B & W recovery furnace and evaporators; three new digesters and auxiliary equipment at Windsor Mills, which will increase daily kraft-pulp production by about 130 tons, and an extension to the converting and bag plant; and the erection of a new million-dollar plant for the Arborite Co., Ville

LaSalle, Montreal. Other changes have been made at the Beauharnois Division, the Crabtree Mills Division, and the Alliance Paper Mills Ltd., Merriton, Ont. R.R.

PAPER MANUFACTURE

"VINETT." A summary of paper-making. Paper Market: 118, 150 (May, June, 1949).

Writing primarily for printers, the author considers the main papermaking fibers, the difference between mechanical and chemical pulp, the use of rags for fine quality papers, the mechanical and hand papermaking processes, and watermarking. R.R.

PAPER SPECIALTIES

ANON. Make meat markets your must market. Paper Sales 9, no. 7: 18-19, 40, 42-3 (July, 1949).

A discussion is given of the paper supplies needed in meat markets, including both the basic and the special items. Among the latter are the various types of butchers' paper, meat pads, sealing tapes and dispensers, dry waxed paper, food pails and trays, chop holders and skewers, and paper caps for retail food handlers. R.R.

ANON. Paper in beauty parlors. Paper & Twine J. 23, no. 5: 10, 26-7 (June, 1949).

The use of parchment paper, pads of kraft-backed cellulose, and retention papers in permanent waving, paper ear shields, cellulose strips to keep the edges of hair nets from marking the wearer's forehead, manicure bowl liners, facial towels, glassine envelopes for sterilized brushes and combs, and emery boards in beauty parlors provide a good market for the paper salesman. R.R.

ANON. What is die wiping paper? Paper & Twine J. 23, no. 5: 12-13 (July, 1949).

Die-wiping papers (used for wiping the surfaces of printing plates free of ink so that it remains only in the engraved portions) are of various types, depending on the particular needs of the job. Good engraving can be produced only if quality paper is used. For very fine engravings, a smooth glazed paper is best because it will not produce scratch lines where there are large color areas; a dull finish or rough surface is best for gold and silver inks. The paper must be sufficiently strong to run through the press without breaking or tearing, be tightly wound and lint-free, and have clean-cut edges and a uniform finish that will not scratch or wear the die. R.R.

CALVER, HOMER N. Paper cups and containers in sanitation. Assoc. Food & Drug Officials U. S. Quart. Bull. 13, no. 1: 30-7 (January, 1949).

The chief role of paper cups and containers is to diminish the exchange of disease-carrying mouth secretions. Recent studies show that paper products are more economical than re-usable dishes which must be washed and disinfected. Various types of paper cups and containers are described and the continuous testing of paper stock and finished containers as carried out at the New York State Agricultural Experiment Station for the Paper Cup and Container Institute is considered. The work of food and drug inspectors supplements this program by guarding against contamination at the point of use. R.R.

CONNOR, C. M. The manufacture of glassine and greaseproof papers. Paper Trade J. 129, no. 1: 34-5 (July 7, 1949).

The initial manufacturing stages of greaseproof and glassine paper are identical to the point where the web leaves the reel of the paper machine. Glassine, in addition, is subjected to subsequent moistening and calendering, making it denser and more air-impervious and oil-resistant than a comparable sheet of greaseproof. Raw materials, pulping, bleaching, stock preparation, sheet formation, drying, supercalendering (of glassine), and finishing of this type of paper are described, with special emphasis on points which differ from ordinary paper manufacture. Today, approximately 100,000 tons of both grades per year are produced in the United States; the annual per capita consumption is about 1½ pounds. E.S.

DAVEY, SIDNEY M. "VPI" papers. Fibre Containers 34, no. 7: 94, 96-7 (July, 1949).

A new method of protective packaging against rust and corrosion employs a volatile corrosion inhibitor which makes moisture noncorrosive to steel. By the use of simple barrier coatings or laminants, the VPI can be kept in a package for extended periods of time. The article to be protected should not touch foreign materials, but be in direct contact with VPI or its vapor. Zinc, cadmium, magnesium, copper, and its alloys are affected by contact with the inhibitor, but the last two are unaffected by the vapor. Steel castings should be lightly oiled before wrapping in VPI to obtain adequate protection. Sunlight and acid vapors decompose VPI, which cannot, therefore, be used in window containers, for articles which are or may become acidic, or in acidic atmospheres. Adhesives must be tested for compatibility with the inhibitor. R.R.

DAY, FREDERICK T. A review of labelling papers. Brit. Packer 11, no. 7: 30-1 (July, 1949).

Label users are interested in the correct adhesive for the job, noncurling gummed papers, and autofeed high-speed gummed papers. The popular dextrin coatings for offset grades, esparto, antique laid, and imitation art papers are discussed. Extra and double dextrin-gummed label papers provide greater grip and tack for shipping, box, brand, and parcel labels, etc. Such difficult surfaces as woolens require unusually heavy gumming. Where purity and freedom from odor are important, as in medicine and food labeling, arabic-gummed esparto body labels are needed. Among the especially strong adhesive label papers are fish-glue coated, luggage label, Woolstik for labelling cloth, Stick to Glass, Permastik for window advertisements, Heatstik for dome-shaped boxes and heat sticking, Superstik for the most difficult surfaces, and Heatfix for dry mounting, showcard, and photographic work and labelling dome-shaped boxes. Coated bond papers are available to match stationery for special campaigns and glued kraft is used when a strong body paper is required for hinge work or tough labels. R.R.

KALAMAZOO VEGETABLE PARCHMENT COMPANY. High gloss wax paper: new wrap for cookies, bread. Packaging Parade 17, no. 198: 45 (July, 1949).

KVP Kalakote has the highest gloss of any waxed paper available and produces an exceptionally strong "welded seal." The gloss remains on the sealed areas if refrigerated plates follow the sealing plates. The paper has exceptional rub resistance and does not become dimmed or clouded on the

shelves. After thermostats have been advanced to higher temperatures, Kalakote will run on all standard packaging machines. R.R.

MICKELSON, OTIS. How to sell quality in napkins. Paper Sales 9, no. 7: 14-15 (July, 1949).

The most effective move in selling facial tissue napkins is to give the prospect several samples to feel and examine closely. After stressing the quality of the product, its softness, flexibility, and high-drape qualities, the salesman can point out the delusion of cheapness and the desirability of providing quality service, including good napkins, along with quality food. The next step is showing that the use of the new napkin will save money for the prospect and still maintain the high standards of the restaurant. Competitor motivation is another important factor in selling. Because the facial-tissue napkin competes with the cloth article, the sale of regular dispenser napkins is not lowered and the salesman can increase his gross sales volume by selling the new product. R.R.

OXTOBY, FRED. The manufacture of wallpaper. Paper & Print 22, no. 2: 186-90 (Summer, 1949).

English wallpapers were not printed successfully by machine prior to the middle 1800's. Block printing by hand is still used where only small quantities of the paper are needed. Stencil plates, employed by the early wallpaper makers, are still used. The cutting of blocks and their utilization in printing, color mixing, machine printing, grounding, and embossing are discussed. R.R.

PAPER SALES. Paper cup accessories can boost your sales. Paper Sales 9, no. 7: 21-4, 32, 34, 36 (July, 1949).

Information is given, chiefly in questions and answers, regarding paper-cup holders and dispensers and portable beverage carriers. Illustrations are included. R.R.

TRODSON, BURTON LEE. Taping. Paper Ind. 31, no. 4: 512 (July, 1949).

Directions for the proper use of gummed tape for sealing cartons and packages are given, including the use of automatic moistening machines, their upkeep, and the correct storage of gummed tape. E.S.

PATENTS

MAKARA, FRANK. Patent licenses. Paper Trade J. 129, no. 3: 41-3 (July 21, 1949).

Patent-licenses agreements may be oral or written, recorded or not recorded in the Patent Office, for the entire United States or merely a designated area, and for the life of the patent or a shorter period. The author discusses pitfalls to be guarded against and the ramifications involving several owners of a patent, foreign patent rights, nonexclusive licenses, sublicenses, royalty agreements, clauses, correct signatures, etc. E.S.

WEST, CLARENCE J. United States patents on papermaking; first quarter, 1949. Tappi 32, no. 7: 45-6A, 48A, 50A, 52A (July, 1949); *cf.* B.I.P.C. 19: 645.

A list of U. S. patents on papermaking for the first quarter of 1949 is presented. E.S.

PHYSICAL TESTING—FASTNESS TO LIGHT

LOWRY, E. M. A proposal for specifying the stability of colored materials to radiant energy. Am. Dyestuff Reptr. 38, no. 15: 543-6 (July 25, 1949).

The specification of color fastness at the present time is usually indefinite and qualitative. Three methods of interpreting spectrophotometric curves taken before and after exposure to radiant energy are discussed. (1) Tristimulus evaluation is cumbersome unless done by a selected ordinate method; the latter is inadequate for filters which transmit only in the extremes of the visible spectrum. (2) Integration of the area under each curve taken before and after exposure leads to error, because curves may cross and have different shape without change of area. (3) The third manner of treating the data and the one recommended by the author is to determine the area between the curves, secured before and after exposure, as a quantitative measure of color fastness. This can be expressed as a percentage of area under the curve of specimen before exposure. 7 curves.

O.H.O.

PHYSICAL TESTING—INK

CARMAN, EVERETT. Drying of printing inks. Am. Ink Maker 28, no. 7: 35-6 (July, 1949); *cf.* B.I.P.C. 19: 646.

Although oxidizing and polymerizing inks dry primarily by oxidation and polymerization of the vehicle, they also dry partially by penetration, with the result that they give varying results on different papers. On machine-finish paper, ink seems to dry quickly but not completely for several hours; on supercalendered paper, more slowly, but with a shorter indefinite stage; and on coated paper, most slowly, but with an almost immediate change to a dry film. The carbonization method of testing drying time by machine measures the number of hours after which the ink will no longer transfer to a covering sheet of paper under pressure. The degree of offset refers to the amount of total film transferred with impression and changes as the ink dries. The offset method of testing requires a crease-resistant paper; the pressure/sq. in. is also important. The printer is concerned with several end points: in the pile, when pressure is relatively low; when the second side is printed and pressure is much higher; when the print is handled in the plant and by the consumer; and the resistance to scratching or marring in the binding machine. Rubbing with the finger, a common test, determines only one end point. Each must be tested separately. Additional work must be done on the correlation of the printer's drying end points with drying on present instruments.

R.R.

PHYSICAL TESTING—MOISTURE

ILES, W. G., and SHARMAN, C. F. The effect of ventilation in moisture testing ovens. J. Soc. Chem. Ind. 68, no. 6: 174-5 (June, 1949).

During a study of the effect of ventilation rate on the loss of weight in tobacco samples obtained in a standard moisture-testing oven, apparently anomalous results have brought to light a "steaming effect" which can seriously vitiate moisture determination on biological material if ventilation with dry air is inadequate. An industrial oven is described which was developed as a result of this work.

E.S.

PHYSICAL TESTING—PAPER—FOLDING ENDURANCE

SPENCER, H. S. Commercial variance in Schopper folding tests. Tappi 32, no. 7: 291-2 (July, 1949).

Samples of paper were sent to eight different laboratories which tested them for folding strength using the Schopper tester. The summary shows that widely varying results were obtained. Tests from each laboratory also show variations over a wide range. Accordingly, it would seem that specifications based on an accuracy of 10 to 20% are too rigid. Indications are that comparisons made on one tester are more valuable than comparisons between instruments. E.S.

PHYSICAL TESTING—PULP

VUORISALO, PEKKA. Testing the quality of wood pulp. Finnish Paper Timber J. 31, no. 5: 77-82; no. 6: 96-9 (March 15, 31, 1949). [In Finnish; English summary]

In the Myllikoski, Finland, paper mill, a sheet-making machine has been constructed by the author (patents applied for) and has been in successful operation for half a year. A description is given of the apparatus, with which it is claimed that the suitability of a groundwood pulp for paper manufacture can be predicted. A sample of 1000 cc. of the fiber suspension with a consistency of 0.08-0.15% is used for forming the sheet on the wire and the drainage time at a vacuum of 50 mm. mercury is noted (S). The white water is returned to the tank of the sheet machine and again passed through the sheet resting on the filter. The drainage time is then determined with pure water at 20° C. and a vacuum of 200 mm. mercury (H). Immediately thereafter, the air permeability of the wet sheet is determined—i.e., the time required for reducing the vacuum under the wire from 300 to 100 mm. mercury (V). The first bursting test is carried out with the wet sheet (15% dry) still on the filter, in order to obtain the first wet strength (M); the sheet is then pressed to 50% dry content and the test is repeated, giving the second wet-strength value (N). The sheet is finally dried to 92% dry content and the dry strength is measured (P). $Y = [80 \sqrt{10\ (1 + \log PMN)}]/[3 + \log (HSV/25 + 600)]$ in which HSV is expressed in seconds and PMN in sq. m. The general value Y expresses the suitability of a given pulp as a papermaking material. The values can be applied also to the control of groundwood-mill operations. E.S.

PHYSICAL TESTING—PULP—STRENGTH

GEOHEGAN, K. P. The problem of strength testing of pulp. Tappi 32, no. 7: 56A, 58A, 60A, 62A (July, 1949).

After briefly referring to the nonuniformity of pulp-testing procedures between different mills—each mill having selected the combination of equipment best suited to its particular needs—the author describes the experience and apparatus used at his mill (a 5-pound beater and hand-sheet equipment manufactured by the Noble and Wood Machine Co.), the reasons for its selection, and the satisfactory results obtained for predicting the strength development of a pulp. The article is essentially a plea for finding a common basis for evaluating pulp tests, regardless of how they are made, and for correlating laboratory tests and mill results on a more fundamental basis than the present empirical comparison. As a starting point for discussion, the author suggests the correlation of pulp tests at a stated amount of cutting, splitting, and hydration. The discussion following the presentation of this paper was not recorded. E.S.

PLASTIC FILMS (NONCELLULOSIC)

ANON. Sterling in polyethylene. Modern Packaging 22, no. 11: 76-7, 216 (July, 1949).

The International Silver Co. will soon be packaging each piece of its sterling flatware separately in printed heat-sealed polyethylene envelopes. The silver was previously wrapped in tissue and parchment and sent to dealers in units according to their orders. On receipt, the retailer had to unwrap the pieces to pick out items for each sale, an inconvenient and time-consuming procedure, during which the silver sometimes became scratched or tarnished. An ink was evolved for printing on the film and a method was developed for making envelopes at high speed from the sheet material. An air jet is used to assist workers in opening the envelopes for filling, but as much air is extracted as possible before sealing to make a neater-appearing package. The envelopes are closed in a new continuous band sealer. The finished packages, each containing one piece of silver, are stacked and taped together according to the individual order. R.R.

PENN, W. S. Properties of plastic film. Part 2. Moisture absorption. Brit. Packer 11, no. 7: 32, 50 (July, 1949); *cf.* B.I.P.C. 19: 762.

The author describes the absorption of moisture by polyvinyl alcohol, rubber hydrochloride, cellulose acetate, nylon, polyvinylidene chloride-acrylonitrile, and polyvinyl butyral, and the influence of R.H. and temperature changes. Polyvinyl alcohol absorbs 4.6% moisture at 40% R.H. and 25° C.; absorption by the other films is quite low. Between 0 and 50% R.H., the moisture absorption is directly proportional to the R.H.; at higher values the relationship is curvilinear. The copolymer and rubber hydrochloride never attain very high values and could, therefore, be used under most conditions. At 40% R.H., a temperature rise from 25 to 40° C. reduces the absorption coefficient about 40% in nearly all cases. Polyethylene film has a very low moisture absorption, followed by the copolymer and rubber hydrochloride. Because more hydrophilic groups mean greater moisture absorption, molecular structures should be considered in choosing packs for various conditions. R.R.

PLASTICS—PRINTING PLATES

ANON. These case histories reveal results of plastic plate runs on boxboard. Shears 67, no. 679: 17, 63 (July, 1949).

Case histories of plastic-plate runs on boxboard reveal that they are not damaged by pressures which push the plates through the board or by strong type wash, give longer runs than chrome- or nickel-plated plates, and can compete with steel for making foil stamping dies. Misregister can occur in a multicolor job unless, during plate manufacture, the same types of pattern plates are used for all colors, all the dead metal of the pattern is routed out before molding the plates, and the grain of the paper filler in the plastic plates is laid in the same dimension when each plate is molded. R.R.

POLYMERIZATION

JOURNAL OF APPLIED PHYSICS. Special issue on high polymer physics. J. Applied Phys. 20, no. 6: 481-575 (June, 1949).

The following papers were presented at a meeting of the Division of High Polymer Physics of the American Physical Society in New York, Jan. 27-29, 1949: Witte, R. S., Mrowca, B. A., and Guth, E. Propagation of audio-frequency sound in high polymers, p. 481-5; Ivey, Donald G., Mrowca, B. A., and Guth, Eugene. Propagation of ultrasonic bulk waves in high polymers, p. 486-92; Ballou, J. W., and Smith, J. C. Dynamic measurements of polymer physical properties, p. 493-502; Spencer, R. S., and Gilmore, G. D. Equation of state for polystyrene, p. 502-6; Sauer, J. A., Marin, J., and

Hsiao, C. C. Creep and damping properties of polystyrene, p. 507-17; Debye, P., and Bueche, A. M. Scattering by an inhomogeneous solid, p. 518-25; Conant, F. S., Hall, G. L., and Thurman, G. R. Relationship between Gough-Joule coefficients and moduli of vulcanized rubbers, p. 526-31; Miller, E., Fankuchen, I., and Mark, H. Polymerization in the solid state, p. 531-3; Beatty, J. R., and Davies, J. M. Time and stress effects in the behavior of rubber at low temperature, p. 533-9; Boyer, Raymond F. The compatibility, efficiency and permanence of plasticizers, p. 540-52; Brown, Alexander. X-ray diffraction studies of the stretching and relaxing of polyethylene, p. 552-8; King, Gilbert W., Hainer, R. M., and McMahon, H. O. Infra-red absorption spectra of some polymers at liquid-helium temperatures, p. 559-63; Kolb, Harry J., and Izard, Emmette F. Dilatometric studies of high polymers. I. Second-order transition temperatures, p. 564-71; Kolb, Harry J., and Izard, Emmette F. Dilatometric studies of high polymers. II. Crystallization of aromatic polyesters, p. 571-5. R.R.

POWER

WESTERHOLM, WOLTER. Finland's supply of energy. Finnish Paper Timber J. 28, no. 18: 269-73 (Sept. 30, 1946). [In English]

A brief summary is given of the three main sources of heat and power supply in Finland (hydroelectric power, domestic fuel, and imported fuel), including statistical information, two tables, and eight graphs. E.S.

PRINTING AND PRINTER'S INK

AREND, A. G. Specialised inks for cartons, wrappers and paper containers. Brit. Packer 11, no. 7: 40, 50 (July, 1949).

Steam-set inks are odorless, have good sealing properties, do not rub off or offset, and are clean and brilliant. The use of synthetic resin binders for these inks should increase stability on the press rolls and water tolerance. The binder must be hard, have a high melting point, and be unaffected by humidity. Another type of ink is described which, on drying, forms metallic lines which are electrical conductors. The printing must be done on board that is dimensionally stable, stiff, and strong so that the lines will remain intact. Although printed electrical circuits have been used, the work is still in the experimental stage. Current resistance causes low temperature fusion of the printed metallic band without damaging the stock, a characteristic which might permit the sealing of a package by the passage of current instead of direct heat application. R.R.

HAMADR. Printing inks for wrapping papers and food wrappers. Allg. Papier-Rundschau no. 2: 64-6 (May 15, 1949). [In German]

The most varied demands are probably placed on printing inks used on wrappers for foodstuffs, chemical and pharmaceutical preparations, and technical articles. The reciprocal action between printing inks and the contents of the packages may manifest itself in one of the following three ways: the contents may affect and destroy the printing inks; the affected inks, in turn, may affect the packaged contents and, in some rare cases, the printing inks by themselves may attack the packaged contents. The great variety of packaged articles makes it impossible to prepare inks which will be resistant to all possible reactions. The destructive action of fats and greases (some of which contain, in addition, salts and preserving agents), volatile oils (notably in spices), cheese, warm bread, chemicals and pharmaceuticals, disinfectants, soap and detergents, bleaching agents, candy (with natural or synthetic flavors), tobacco, dyed textiles, and some of the many

new plastic products (such as synthetic rubber heels) are listed as examples of the first possibility. Butter, cheese, and similar foodstuffs are also representatives of the second group; in this case, the most important requirement of the pure food laws is the specification for the absence of any toxic ingredient in ink used on wrappers for food, cosmetics, toys, etc. The third possibility—that of the printing inks' affecting the contents—is very rare and applies particularly to the photographic industry, for instance, the wrapping of x-ray films, which requires inks that are photochemically completely inactive. In conclusion, the means are discussed by which the printer and purchaser of print can protect themselves against unforeseen reactions. Co-operation between all concerned is the first essential. The printer should be informed about the purpose for which the wrappers will be used and the requirements placed on them; he, in turn, should supply samples of the printed wrappers to the buyer to experiment with them. The printer should also send sufficient paper samples to the inkmaker and provide him with all necessary information on use requirements. The inks must dry thoroughly to a hard film, and letterpress printing gives the best results in this respect; the aniline process from rubber plates is also suitable. If, in spite of all precautions, certain goods are still unfavorably affected by the printed wrappers, double wrapping offers a final solution. The article is first wrapped in an impermeable sheet, and the printing is applied to the outer wrap.
E.S.

KING, CHARLES F. Perverse behavior of paper. Inland Printer 123, no. 4: 51-3 (July, 1949).

Usually several rolls of paper are sheeted at a time, so that successive sheets are generally taken from different rolls. Although each roll may conform to the manufacturer's specifications, those specifications are not based on a work trial of printing and lithographing properties. It is impossible to state positively that two successive sheets from the same lot will print the same color, even when fed without press or ink changes. It would be advantageous for the printer, inkmaker, and papermaker to speak the same language and co-operate more closely. R.R.

PATTISON, ROBERT W. Paper—a printer's raw material. Paper Trade J. 129, no. 1: 32-3 (July 7, 1949).

Examples of the importance of paper conditioning and grain in offset printing, and of surface and density in any printing process are given.
E.S.

ST. JOHN, EUGENE. Mottling—causes and cures for this ink blemish. Inland Printer 123, no. 4: 74-5 (July, 1949); *cf.* B.I.P.C. 19: 578.

Although mottle seems to be defective inking, it may be caused by the printing surface, the press, presswork, the atmosphere, or the quantity of ink fed to the form, each of which is discussed. The suitability of the ink for the sheet to be printed is of primary importance. A better ink often overcomes the difficulty. Papers with harder surfaces are more inclined to show mottle than softer-surfaced sheets, especially when soft inks are used. Tints are apt to mottle on coated paper and are best reduced from the original color by the addition of a transparent tint base rather than a mixing or opaque white. R.R.

RAYON—VISCOSE PROCESS

LAUER, K., JAKS, R., and SKARK, L. Information on the xanthation of cellulose. Kolloid-Z. 110, no. 1: 26-34 (January, 1945);

C.A. 43, no. 12: 4848 (June 25, 1949). [In German; abstract in English]

Xanthation of cellulose can proceed farther than a molecular percentage of 0.5, and the result depends a great deal on the combination of sodium hydroxide in mercerization. Crystallization of fibrous regions occurs; the process depends on the percentage of carbon disulfide. Methanol and ethanol give lower values than carbon disulfide. Data are given for sulfur and sodium contents, pretreatment, and grinding, and treatment by methylation and acetylation. Digestion with hydrochloric or sulfuric acid gives the same percentage formed and the sirupy mass does not crystallize. Xanthation takes place only in amorphous regions and, therefore, near the surface of the crystalline material. The degree of xanthation does not predict its ease of filterability. 18 references. E.S.

SAMUELSON, OLOF. Xanthation of cellulose by emulsified carbon disulfide. Svensk Kem. Tid. 61, no. 4: 79-89 (April, 1949). [In French]

In studying the structure of cellulosic fibers and the chemistry of the viscose process, the author has undertaken a laboratory study of the xanthation of cellulose by carbon disulfide in emulsion in caustic soda. The present article is a report on some experiments showing modifications brought about in cellulose by treatment with caustic soda under different conditions. The investigation is being continued, and a more comprehensive discussion is promised. The comparison of the different cellulosic samples involves the measurement of the amount of material which remains undissolved following a standard laboratory-scale xanthation of a 0.5 gram sample in a glass-stoppered bottle. The undissolved portion is centrifuged, washed free of the reaction mixture, and weighed. Experiments were made with several spruce sulfite pulps, cotton linters, and standard viscose pulp. It was shown that cellulose regenerated from a ripened alkali cellulose gave a larger sulfuration residue than the original pulp, even without drying the sample before xanthation. The inactivation occurred when the alkali was washed out; it arises principally from modifications of the structure induced by washing. When cellulose was treated with caustic soda without a subsequent washing or dilution, a slight increase in the sulfuration residue was produced, but it was relatively small. A mercerization, followed by a dilution to the concentration suitable for the determination of the sulfuration residue, on the other hand, gave a smaller residue than with nonmercerized pulp. This is attributed to a higher concentration of caustic in the solid phase. Treatment with caustic at 0° C. gave a lower sulfuration residue than treatment at 20° C., which also results from an increase in absorbed caustic. 11 references. M.A.H.

REPORTS—PREPARATION

GRAY, DWIGHT E. How readable is your technical report? J. Chem. Education 26, no. 7: 374-6 (July, 1949); *cf.* B.I.P.C. 18: 624.

The author gives reasonably specific rules to aid authors while writing technical papers and a prepublication checking routine. The introductory sentences of the report should orient the reader with what follows. The main body contains the technical material, and should be logically presented, constitute a unified whole, and result from careful thought. The concluding paragraphs should summarize the main points and draw conclusions from these points. No technical report should be without a concise abstract, which may describe the paper sufficiently well that the reader can

determine whether or not he wishes to read it, or summarize the main arguments, data, and significant conclusions. The good title is a compromise between brevity and succinctness on the one hand, and description and definition on the other. Questions are given to be applied to each of the above sections of a paper, which are best checked by someone other than the author. R.R.

RESEARCH LABORATORIES

ANON. The new chemical pulping laboratory at the Pulp and Paper Research Institute. Pulp Paper Mag. Can. 50, no. 7: 83-4 (June, 1949).

The new chemical pulping laboratory at the Pulp and Paper Research Institute of Canada consists of three stainless-steel digesters and an accumulator, designed for use in either alkaline or acid processes. An illustrated description of the equipment is given. R.R.

ANON. Research Association forges ahead. World's Paper Trade Rev. 132, no. 2: 72, 74, 76, 96 (July 14, 1949).

Brief reference is made to the activities of the British Paper and Board Industry Research Association, its headquarters at St. Winifred's, Kenley, the laboratories and its equipment, the library and conference room, and the filtration plant. Although the association undertakes work on practical mill problems, it is concerned primarily with the investigation of fundamental studies, the results of which are made available to its membership in the form of reports. About 14 reports and memoranda have been released to date. It is hoped a three months' instructional course for (primarily) unqualified paper-mill laboratory personnel can be instituted in the near future. The course could be extended to include young graduates without practical mill experience. E.S.

SHIPPING CONTAINERS

ANON. Sugar—a Western giant. Modern Packaging 22, no. 11: 126-9 (July, 1949).

The inability to obtain cotton fabric for sacking during the war forced the development and use of paper packaging for sugar, there being almost 100% conversion. The California & Hawaiian Sugar Refining Corp. uses duplex square-bottom kraft bags which are closed by stitching over crepe-kraft reinforcing tape. Master bags for unit packages are four-wall kraft containers closed similarly to the small sizes. Brown sugar is packaged in lined cartons made on a double-package maker. Waxed paper is formed around a block and heat sealed. The carton is made around the block and liner and glued. Cartons for powdered sugar are supplied folded flat, but with the side seams glued in place. Shipping cases for consumer packages are closed by preferential adhesion; a band and diamond-inked design prevents the glue from adhering to the portions of the surface so covered. Hundred-pound quantities are handled in multiwall paper bags. Palletizing is used for all materials not conveyed on belt systems. R.R.

ANON. "Tough" packaging assignment. Packaging Parade 17, no. 198: 54 (July, 1949).

A corrugated paper carton with a die-cut interior is used to store and protect automotive battery testers and spare glass parts. The container consists of an outer and inner liner and a fluted corrugated medium. Complete package information is printed on the ends of the carton so that it can

be identified when in storage. Solid fiber die-cut pads sufficiently strengthen the box so that it can be taped and used as an efficient shipping container. R.R.

SCHWARTZ, ABRAHAM. The Pilfapruf box. Fibre Containers 34, no. 7: 38, 40 (July, 1949).

The Pilfapruf box is a one-piece container made from a single sheet of board, having a flapless solid bottom with no open ends or center slit for easy entry. It can be collapsed flat when not in use and easily snapped open. To close the container, the two end flaps are folded inward making the closure impenetrable. One strip of gummed tape applied where the top flap meets the side wall seals the container; an alternative method is to preglue the bottom of the front half of the top flap and apply moisture when the seal is desired. The tapered top can be cut out to form a handle which slips through a center slit on the corresponding opposite top. Additional strength can be imparted by constructing the container with a double bottom. Illustrations are given. R.R.

SHIPPING CONTAINERS—EXPORT PACKAGING

ANON. Three-way export pack. Modern Packaging 22, no. 11: 104-5, 214, 216 (July, 1949).

The Fancy Containers Division of I. D. Co., New York, ships flat corrugated blanks, collapsed dividers, and lining pads to foreign manufacturers, who use the containers for shipping their products to the importer; the containers are usually not unpacked by the importer, but relabeled and forwarded to the domestic buyer, which was impossible when 100-250 units were packed together. The damage on imported fancy boxes has fallen from an average of 4-8% per shipment to less than 1%. Shipping charges from England to New York have been reduced 15-20% and the domestic charges from New York to the buyer, 33-35%. The cost of the shipper and its inside dividers and liners is 50% less than the wooden cases formerly used and packing costs have been reduced; 15% is saved on storage space in the New York warehouse. The shipper has full overlapping ends sealed with special moistureproof adhesive and is made of 350-test, double-wall board with inner liners and dividers of 200-test, double-wall corrugated. A 2-inch overlap along one side edge is metal stitched. R.R.

FARRELL, JAMES A., JR., *and others.* To improve methods of export packaging. Fibre Containers 34, no. 5: 97-101; no. 6: 87-91; no. 7: 80-4, 101-3 (May-July, 1949).

A transcript is given of the meeting of consignees, shippers, freight brokers, manufacturers, marine insurance interests, and supplier and packaging organizations held in New York on Feb. 2, 1949, to organize an educational campaign against the losses of steamship companies and underwriters caused by inadequate export packaging. Each speaker presented the views of the interests he represented. It was agreed that a concerted communal effort be made to remedy the present unsatisfactory conditions and that a representative committee be appointed to study export-packaging deficiencies, make recommendations for eliminating them, and submit a report and recommendations to the President of The Maritime Association of the Port of New York by April 30, 1949. R.R.

SHIPPING CONTAINERS—FROZEN FOODS

ANON. Quick-freezing industry. Brit. Packer 11, no. 7: 26-9 (July, 1949).

A description is given of frozen-food packaging at the Birds Eye plant at Great Yarmouth, England. A tapering carton of waxed paperboard with creased shoulders, a heat-sealing horizontal folded-over top closure, and a rigid base is suggested for syrup-packed foods. Investigations are being made of a rubber preparation with wax to make waxed paperboard less susceptible to cracking. An easily assembled corrugated case with sandwich construction and double thickness, called "Keepcold," gives good insulation and is used to transport consumer units from wholesaler to retailer. R.R.

SHIPPING CONTAINERS—MULTIWALL BAGS

CALLAHAN, T. PAT. Multiwall bags coated with polyethylene. Chem. Inds. 65, no. 1: 104, 106 (July, 1949); Paper Ind. 31, no. 4: 451 (July, 1949).

Brief reference is made to multiwall bags of kraft paper coated with synthetic resins (polyethylene in particular), developed by the St. Regis Paper Co. The coating gives improved protection from moisture and grease, and strengthens the paper. Polyethylene, in addition, is chemically inert, odorless, and tasteless, which makes it suitable for packaging chemicals as well as food products. E.S.

SHIPPING CONTAINERS—TESTING

MUELLER, MAX F. Psychrometric behavior in closed packages. Modern Packaging 22, no. 11: 163-7 (July, 1949).

Basic psychrometric concepts are reviewed and a report is given on an investigation of humidity variation in closed containers subjected to normal outdoor weather conditions and the mechanism of the phenomena involved. Welded aluminum containers, variously loaded, were equipped with dew-point and dry-bulb temperature recorders from which the R.H. could be calculated at any time. "Lag loops," produced by continuous variations in R.H. and dew-point temperatures in a closed container, are diagrammed and explained. It was found that the R.H. in a space varies continuously with temperature changes, the variations being modified by the release and absorption of residual water. It is unnecessary for satisfactory product preservation and impossible to hold a fixed R.H. in any container subjected to temperature variation. If large daily temperature swings are anticipated, the average R.H. in a package must be held at a lower level for satisfactory preservation than if the daily temperature variations are small. The greater the heat-storage capacity in the package, the less will be the daily temperature swings and the smaller the daily variation in R.H. All materials in a package act as desiccants to some extent. The amount of residual water to be removed to establish safe storage conditions is usually a function of the amount and character of the surface and is independent of the weight of the materials, except with fibrous or hygroscopic substances. The initial amount of water in the atmosphere of a package is negligible compared with the quantity of residual water that must be removed from the materials to establish a safe humidity level. R.R.

SLIME PREVENTION

EKHOLM, BENGT. Studies on the purification of white water by coagulation. Svensk Papperstidn. 52, no. 9: 227-37 (May 15, 1949). [In Swedish; German and English summaries]

In the saveall systems which are based on the coagulation of fibers to bigger aggregates, rosin size is usually employed as the active colloid. The size, however, is very sensitive to the protective effect of other colloids, par-

ticularly residues of black and sulfite cooking liquors. Fillers, such as clays, may also interfere with the coagulation process by adsorbing the size. In place of rosin, sodium pectate is recommended as the active colloid. It is less influenced by other protective colloids and the inhibiting effect may be entirely eliminated by the addition of calcium ions; moreover, fillers promote coagulation in this case. The difference in the behavior of the two agents is probably based upon the greater affinity of the pectate for the dispersing agent, water. To save time, all tests were made by photoelectric, instead of the conventional gravimetric, methods; they gave sufficient accuracy for this purpose. 18 tables and 18 diagrams. E.S.

GUSTAFSSON, KARL-FREDRIK. Fiber recovery in wood-conversion industries. Svensk Papperstidn. 52, no. 9: 210-13 (May 15, 1949). [In Swedish; German and English summaries]

Continuous and intermittent fiber losses in the pulp and paper industry are discussed, as well as closed white water systems and recovery methods by sedimentation, filtration, and flotation. The removal of rosin from sulfite pulp has created special problems. The so-called zero fiber fraction (ray cells) can readily be retained by Waco filters; the successful utilization of this fraction has not yet been solved. Reference is made to the discoloration of pulp (unbleached in particular) recovered in flotation equipment, which becomes especially noticeable in the manufacture of fine papers. Process water rich in humic substances, the presence of ray cells, the size, and alum are considered contributing factors. Some mills have, for this reason, been forced to reduce the efficiency of their recovery equipment from 95 to 80%; in others, the problem could only be solved by using this pulp for cheaper wrapping papers, etc., instead of re-introducing it into the main manufacturing process; both expedients represent financial losses. The advantage of a low water content in the recovered pulp is emphasized. The highest pulp consistency is obtained with filters (6-8%); a somewhat lower consistency results in sedimentation equipment and, among the flotation-type savealls, the Sveen-Pedersen apparatus with 1-2% gives higher values than the Adka and Savalla types (only a few tenths of 1%). E.S.

PEHRSON, STIG O. Combating micro-organisms in groundwood and paper mills. Svensk Papperstidn. 52, no. 9: 217-20 (May 15, 1949). [In Swedish; German and English summaries]

The author presents a general review of the sources of infection and growth of micro-organisms in pulp and paper mills. The sterilizing effect of high temperatures in integrated groundwood and paper mills as an aid to slime control is mentioned. Steps for reducing the contamination within the mill are outlined (chlorination of water, good housekeeping, high temperatures, disinfection of the white water system, etc.). The effect of various disinfectants is discussed and the superiority of the organomercurials is stressed. Further studies of the retention of mercury on the fibers are reported. The author has succeeded in isolating pure cultures of sulfate-reducing bacteria (Desulphovibrio) from a paper-machine system. The metabolism of these unique bacteria produces hydrogen sulfide, in the presence of which the antibacterial action of mercury is neutralized and mercury is precipitated as inert sulfide. In conclusion, experiences from the use of organomercurials in pulp and paper mills are given; methods for controlling and determining effective and economical doses are briefly mentioned. E.S.

SPECIFICATIONS

ROYCE, CLINTON K. Federal and military specifications. Fibre Containers 34, no. 7: 56-8 (July, 1949).

There are three types of Federal and military packaging specifications, covering containers and packaging materials, procedures for packaging broad categories of commodities, and all kinds of items. In addition, there are levels of specifications: if any government department other than the military is interested in using a specification, the document appears as a Federal Specification, even though the military services are also interested; if the interest is entirely military, the specification is processed as JAN; and if the interest is limited to the air forces, the specification appears as AN. There is a constant effort to simplify such specifications to make them easier to read, interpret, and use. Where possible, they follow industry standards.

R.R.

STARCH

BECHTEL, WELKER G., and FISCHER, EARL K. The measurement of starch paste viscosity. J. Colloid Sci. 4, no. 3: 265-82 (June, 1949).

Measurement of the flow properties of starch pastes with the precision and accuracy required for industrial purposes is feasible. The methods described utilize the Corn Industries viscometer and a modified Stormer viscometer. The former provides a continuous record of the change in flow properties during pasting at a controlled cooking temperature; the latter supplements the data obtained during pasting with a rate of shear-shearing stress curve from which the apparent viscosity, expressed in poises, can be computed at any given rate of shear. Rheological data on a variety of commercial starches were obtained. The effect of rate of shear, concentration of the starch, and other factors are discussed. In all cases a curve typical of pseudoplastic flow was obtained. Continuous decrease in apparent viscosity occurs during the pasting process with the greatest change in the first hour; for many starches a fairly level viscosity is obtained after cooking for one hour at 90-92° C. Vigorous agitation, in contrast to that obtained with low-speed sweep agitators, produces a more rapid decrease in viscosity, but differences in agitation apparently do not alter the nature of the pasting process. The effect of rate of shear on the computed values for apparent viscosity is great. Satisfactory measurements can be made only when the rate of shear is constant or when the magnitude can be determined and specified. The measuring methods described are reproducible and characterize the starches with respect to rate of pasting and the flow properties of a given paste at different rates of shear. Industrial measurements can be made more precise by these means, and discrepancies in standardization and grading can be largely eliminated. 35 references. E.S.

HILL, EDWARD H., and SLIWINSKI, VALENTINE X. Water-resistant starch pastes. Tappi 32, no. 7: 297-9 (July, 1949).

The need of water-resistant pastes for paper containers of all kinds is outlined. Investigations with different materials needed to give water resistance are listed. From these it is concluded that the degree of water resistance varies inversely with the amount of starch conversion. Data are presented showing that the best type of water-resistant paste from the standpoint of pot life, machine operation, etc., is made by cooking a resin with starch and/or dextrin at a temperature around 195° F. and a pH between 5.0 and 6.0 with two plasticizers, such as a neutral salt and a hydrogenated vegetable fat. 11 references. E.S.

STEAM POWER

HEIKEL, GÖRAN F. Should operating reports employ heat units in the place of steam quantities? Finnish Paper Timber J. 28, no. 17: 259-61 (Sept. 15, 1946). [In Swedish]

The author advocates the use of heat units (calories) in steam-plant statistics instead of steam quantities, in order to obtain comparable figures for different mills. Examples of monthly reports for heat and steam consumption in sulfite, sulfate, and paper mills are given. E.S.

MACKLEM, HAROLD G. Generate all steam power for modern kraft pulp and paper mill. Industry and Power 57, no. 1: 72-5 (July, 1949); *cf.* B.I.P.C. 18: 851.

The total rated steam-generating capacity of the Pensacola, Florida, mill of the Alabama Pulp and Paper Co. is 270,000 lb./hr., produced by an integral furnace boiler, two black liquor recovery units with separately fired superheaters, and a waste-fuel boiler. About 45% of the total steam requirement is generated from by-product fuels, the remainder by gas-burning units equipped with emergency oil-burning facilities. The turbines, boilers, electrical distribution, and operating conditions are discussed. Two diagrams show the electric-power distribution and steam flow. R.R.

STRAW

ARONOVSKY, S. I. The place of straw pulp in fine paper manufacture. Chemurgic Digest 8, no. 7: 4-6, 16 (July, 1949).

The trend from general-purpose papers toward specialty items and the growing interest in the conservation of resources favor blends of straw and other papermaking pulps, the straw pulp providing characteristics not so easily or well attained with other pulps. Until the early part of this century straw was an important paper raw material in the United States; it is still widely used for fine papers and boards in Europe and South America. The main domestic commercial use for straw pulp now is in the manufacture of corrugating strawboard. Most commercial straw pulps are made by the soda, kraft, or chlorine processes, with bleached-pulp yields of about 35-45%, based on the original straw. The common disadvantage of the pulps is that they are "slow," chiefly because of incompletely disintegrated fine platelets and cells which pack and prevent the efficient drainage of water from the paper web. A neutral sulfite process and a mechano-chemical process, both recently developed by the Northern Regional Research Laboratory, yield 50-52% of improved bleached pulp. No special equipment is needed other than what is usually available in pulp mills. Straw pulp should be blended with other pulps to provide improved papers; it should not be considered merely a substitute for scarce wood pulp. Paper made entirely from bleached straw pulp can be printed, but will not meet all the requirements of newsprint and book and magazine papers. With its rapid hydrating and good strength properties and its ability to improve the formation, surface, and feel of most papers, straw pulp should find use as a permanent supplementary raw material for fine specialty papers. R.R.

STREAM POLLUTION

HOLDERBY, JESSE M. Primer on stream pollution. Fibre Containers 34, no. 7: 61-3 (July, 1949); Paper Ind. 31, no. 4: 509-11 (July, 1949).

Following a review of the legal aspects of pollution, the author discusses the basic types: Organic pollution is usually consumed in the stream by oxidation; therefore, its principal effect is the depletion of oxygen in the water, forcing fish to migrate or suffocate. It frequently results in the generation of hydrogen sulfide by putrefactive bacteria with accompanying rotten-egg odors. Causative materials are algae, vegetation, garbage, domestic sewage, wastes from the manufacture of pulp, paper, milk products, canned

food, meat, etc. Inorganic pollution may be toxic, but usually comprises simple inert material that settles out, such as mine drainage, gravel washings, and boiler blowdown. Bacterial pollution involves disease-producing bacteria and is the only type creating any significant hazard to public health. Its only significant source is human excreta entering the stream as domestic sewage. Pollution originates from nature and domestic, industrial, and agricultural activity; it inevitably accompanies civilization. Because it is offensive to man or dangerous to aquatic life only when excessive, any realistic approach to stream sanitation must seek to control, rather than abolish, pollution. R.R.

LINDROTH, ARNE. New experiments concerning the toxicity of effluents from sulfate mills. Svensk Papperstidn. 52, no. 9: 237-8 (May 15, 1949). [In Swedish]

Using roaches as test fish and the technique and "poison unit" developed by Bergström and Vallin (*cf.* B.I.P.C. 10: 448), in the spring of 1948 the author tested the effluents of several Swedish sulfate mills and compared the results with previous data from different mills. In the earlier results, the largest percentage (about 80%) of the toxic substances of the mill effluents could be traced to the resinates in the diffuser wash water; better washing techniques and increased diffuser capacity have reduced this value considerably in 1948. The most harmful constituent in the recent studies was the condensate from the digesters. The mostly volatile poisons in this condensate, however, can be readily eliminated by aeration. Several Swedish mills make use of the Bergström exhausting tower (*cf.* B.I.P.C. 9: 476) for this purpose. E.S.

SULFITE PROCESS

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY. Standard terms used in the sulphite pulping process. Tappi 32, no. 7: 52A (July, 1949); *cf.* B.I.P.C. 19: 121.

This is a revision of TAPPI Tentative Standard O 406 p-48. E.S.

SULFITE WASTE LIQUOR

LEDINGHAM, G. A. Industrial fermentations on waste sulphite liquor. Pulp Paper Mag. Can. 50, no. 7: 93-9 (June, 1949).

The author considers the supply, composition, and treatment of sulfite waste liquor and microbiological, chemical, and engineering problems associated with liquor fermentation. The adaptation of previously neglected fungi, bacteria, and actinomyces to withstand the toxic compounds in the liquor and an examination of their ability to break down pentoses and lignin compounds might result in the production of lactic acid, butyl alcohol, and other useful products, as well as assist in slime control. The co-operation of chemists is needed to devise adequate biochemical methods for determining and isolating fermentation compounds as they are produced. Further chemical research may result in the discovery of applications in the plastics industry of the abundant organic acids formed in aerobic fermentations with molds, the production of various fungicides, the use of chromatography for recovering small quantities of valuable chemicals which would otherwise be lost, and the efficient solvent extraction of chemicals from waste liquors. Engineering studies are required on the new submerged-culture techniques for molds, the corrosion and toxicity to organisms of metal vessels, equipment for solvent extraction, centrifugation, filtration, and processes using chromatography and ion-exchange materials. Rapid progress can be made only by large co-operative projects supported by the entire industry. The author

recommends the establishment of a microbiological institute in Canada with a minimum staff of 25 professional biologists, chemists, and engineers. 17 references. R.R.

McLAUGHLIN, R. R. Liquid-liquid extraction of waste sulphite liquor. Pulp Paper Mag. Can. 50, no. 7: 91-2 (June, 1949).

The extraction of sulfite waste liquor with such organic solvents as benzene and ether isolates about 1 g. of material/liter of liquor. Approximately 0.3-0.5 g. can usually be separated as conidendrin crystals having the chemical structure attributed to it by Erdtman (*cf.* B.I.P.C. 5: 107). Little attention has been given to noncrystalline products in the solvent extracts and no mention has been made in the literature of the efficiency of extraction processes with regard to large-scale extract recovery. Continuous liquid-liquid extraction, possible uses for conidendrin, and the fractionation of noncrystalline materials in the extract should be studied more fully. 13 references. R.R.

MARSHALL, H. BORDEN. General review of the industrial utilization of waste sulphite liquor. Pulp Paper Mag. Can. 50, no. 6: 123-6, 128 (June, 1949); *cf.* B.I.P.C. 19: 122-3.

Following a consideration of the solids composition of sulfite waste liquor and the chemical loss through its disposal as waste, the author reviews chiefly the methods used industrially for the utilization of the liquor. Processes for heat and chemical recovery from calcium-, magnesia-, ammonia-, and soda-base liquors, uses of the liquor based on physical and chemical properties, and methods for the recovery or production of organic chemicals are discussed. R.R.

SAMUELSON, OLOF. Studies on the incrustation problem of sulfite waste liquor. Svensk Papperstidn. 52, no. 11: 283-9 (June 15, 1949). [In Swedish; German and English summaries]

The precipitation of calcium sulfate from sulfite waste liquor has been studied as a function of time, the pH of the liquor, and the temperature. The amount precipitated reaches a maximum at a pH of about 3.5 and decreases with higher and lower values. All other factors being kept constant, the sulfate precipitation increases with increasing temperature. In addition, the amount of calcium sulfate crystals suspended in the sulfite waste liquor has a great influence upon the rate of precipitation. Calcium sulfate in solid form will act as crystallization nuclei, which promote continuous precipitation. Within the range of 8-20%, the total solids content of the liquor has only a slight effect on the amount of precipitate formed. Investigations of industrial evaporator plants show that the deposits in certain cases are greater when acid instead of neutralized liquor is evaporated. This is in accordance with laboratory experiments concerning the influence of pH on the precipitation of calcium sulfate. X-ray investigations of the precipitates during evaporation show that anhydrite is formed at a temperature higher than 130° C. In evaporators operating at temperatures of 100-130° C. the semihydrate form has been detected. 7 tables and 9 figures. E.S.

TENSION WOOD

WARDROP, A. B., and DADSWELL, H. E. The nature of reaction wood. I. The structure and properties of tension wood fibers. Australian J. Sci. Research 1B, no. 1: 3-16 + 4 plates (February, 1948).

An examination has been made of the cell-wall structure of tension-wood fibers isolated from several Australian species, including *Eucalyptus regnans* F.v.M., *Eucalyptus gigantea* Hook. f., *Nothofagus cunninghamii* Oerst., and *Acacia melanoxylon* R. Br. It has been demonstrated that the so-called tertiary or gelatinous layers of these fibers are unlignified and consist almost entirely of a very highly oriented form of wood cellulose. X-ray, optical, and visual evidence suggests that the secondary wall of tension-wood fibers of *Eucalyptus regnans* F.v.M. consists of three layers of different micellar orientation: an outer layer in which the micelles are oriented at 40° to the longitudinal fiber axis; a middle layer where the angle of micellar orientation is 18°; and a broad unlignified inner tertiary layer in which the micelles are oriented at approximately 5° to the longitudinal fiber axis. Reference is made to the possible relationship between the abnormal properties of tension wood and the nature of the cell wall. It is suggested that the lack of lignin in the cell wall may account for the high tensile and low compressive strength of tension wood. No satisfactory explanation of the high longitudinal shrinkage of tension wood has been forthcoming. Slip planes and minute compression failures in tension wood are discussed in relation to Chow's claim (*cf.* B.I.P.C. 19: 462) that incipient tension failures are present in tension-wood fibers. 20 references. E.S.

VANILLIN

PEARL, IRWIN A. Reactions of vanillin and its derived compounds. VIII. The ultraviolet absorption of vanillic acid and related acids and their esters. J. Am. Chem. Soc. 71, no. 7: 2331-3 (July, 1949); *cf.* B.I.P.C. 19: 592.

The ultraviolet absorption spectra of a large number of esters of vanillic acid and the closely related acids, orthovanillic and 5-chlorovanillic, were determined. Spectra for the parent acids and related aldehydes were included. E.S.

VENTILATION

ANON. Largest air system installed on Macon Kraft machine. Paper Mill News 72, no. 30: 50 (July 23, 1949); *cf.* B.I.P.C. 19: 758.

The J. O. Ross Engineering Air System on the Buccaneer, new kraft machine of the Macon Kraft Co., Macon, Ga., is described. R.R.

VISCOSITY

KRIEBLE, JAMES G., and WHITWELL, JOHN C. The viscosity of Newtonian, pseudoplastic, and dilatant liquids; use in the measurement of the D. P. of high polymers. Textile Research J. 19, no. 5: 253-8 (May, 1949).

The measurement of the viscosity of high polymer solutions, such as cellulose and its derivatives, offers the most convenient method for measuring an average molecular weight of the polymer. However, most high polymer solutions do not fulfill the condition that the shear stress is directly proportional to the rate of shear as stated by Poiseuille's law for Newtonian liquids, and consequently the viscosity is not independent of the rate of flow and the type of viscometer used. Several investigators have noted that for a variety of high polymer solutions the logarithm of the rate of shear is directly proportional to the logarithm of the shear stress over wide ranges. For such liquids, therefore, the rate of shear is inversely proportional to a counterpart of the Newtonian viscosity and directly proportional to a power (greater than one) of the shear stress. The same equation also holds for a

dilatant liquid, but in this case the exponent has a value less than one. The equation may therefore be considered as a generalized form of Poiseuille's law when rate of shear may be expressed as a power function of the shear stress. In applying this more general relationship to viscosity measurements, a viscosity ratio counterpart is calculated from the capillary viscometer flow times for solution and pure solvent and from the measured dimensions and constants of the viscometer. The specific viscosity counterpart divided by the concentration is linear with respect to the concentration, so that by making several measurements at different concentrations a straight line can be plotted which, on extrapolation to zero concentration, gives a value for the intrinsic viscosity. From the intrinsic viscosity the D.P. of the polymer can be calculated. 12 references. M.A.H.

STOW, F. S., JR., HOROWITZ, K. H., and ELLIOTT, J. H. Application of the rising-column capillary viscometer to the high-viscosity range. J. Colloid Sci. 4, no. 3: 321-31 (June, 1949).

The rising-column capillary viscometer has been adapted to the determination of the viscosity of liquids having viscosities of 10^3-10^6 poises or higher. The operation of this instrument has been analyzed, taking into account apparatus constants and sources of error such as kinetic energy, surface tension, annular pressure drop, and possible end effects. Several forms for the equation for the viscosity in terms of apparatus constants and applied pressure are presented and their range of applicability analyzed. Based on this analysis, a set of instruments has been constructed and tested with hydroabietyl alcohol (50,000-75,000 poises) at room temperature. The results were checked by determination of the viscosity by the falling-ball method at comparable maximum shear rates, 0.001-0.015 sec.$^{-1}$. The results by these independent methods are in good agreement. 10 references. E.S.

WATER-MARKS

WEISS, WISSO. The historical post paper. Allg. Papier-Rundschau no. 4: 166-7 (June 15, 1949). [In German]

Before the introduction of the paper machine, "post paper" was an expensive kind of writing paper made from the best linen rags; it was not identical with ordinary writing paper, but thinner and more delicate. The symbol of the postal services, the post horn, was frequently used as a watermark; it represents one of the most widely utilized of the old watermarks. Occasionally, the postrider was employed as a mark, particularly after the close of the Thirty Years' War, when the word "pax" was included as a peace message. The use of the postrider watermark in mills of Germany, Holland, and Austria is discussed. 2 illustrations. E.S.

WET STRENGTH

COLLINS, T. T., JR., and ADRIAN, ALAN. Wet strength paper, a review of the literature. Paper Mill News 72, no. 17: 26, 28, 30, 32-3; no. 18: 10, 12, 14; no. 19: 9-10; no. 20: 16-18; no. 21: 28, 30, 32; no. 22: 12-13; no. 23: 10, 12; no. 24: 12, 14; no. 25: 12, 14; no. 26: 40, 42; no. 28: 14, 16, 20, 22; no. 34: 24 (April 23-June 25, July 9, Aug. 20, 1949); *cf.* B.I.P.C. 13: 455.

This review contains 425 references to the literature and patents on wet-strength papers through 1947, including the 96 references of the previous compilation. Wet strength may have been imparted to paper by treatment with regenerated cellulose, cellulose derivatives, proteins, synthetic resins, mannogalactans, high drying temperatures, esterifying agents, silica, polymer-

ized vegetable oils, natural or synthetic rubber, etc. Applications, methods of testing, and various theories of the cause of the wet-strength phenomenon are also discussed. E.S.

WHITE WATER

BOLIN, GÖSTA. White water treatment and fiber recovery in a newsprint mill. Svensk Papperstidn. 52, no. 9: 214-16 (May 15, 1949). [In Swedish; German and English summaries]

The closed white water-treatment and fiber-recovery system of the Swedish newsprint mill at Kvarnsveden with integrated groundwood and sulfite mills is discussed. The white water from the newsprint machines and broke beaters is pumped to three settling tanks, and the cleaned white water is re-used in showers on screens and wires. No slime trouble has resulted. Slivers and knots from the groundwood mill are comminuted in Haug refiners and the pulp is added to the newsprint stock. The white water from the paper machines making magazine paper (with a higher sulfite percentage than standard newsprint) is cleaned successfully in a Waco continuous vacuum filter. The fiber loss from the paper mill is only 0.25% of the total mill production; the groundwood and sulfite mills have hardly any fiber losses. E.S.

LUNDGREN, NILS. Slime control in a newsprint mill. Svensk Papperstidn. 52, no. 9: 221-6 (May 15, 1949). [In Swedish; German and English summaries]

In the newsprint mill at Holmens Bruk, Norrköping, Sweden, with two high-speed machines, slime control has been improved through the application of phenylmercuric acetate in powder form. Toxicity risks were carefully studied before the treatment started and current control is maintained. The chemical is introduced into the Trimbey regulator once or twice per 24 hours; usually 11.5 g./ton of paper are added. A study of the distribution of the mercury compound in the mill system has shown that approximately 90% remains in the paper and 10% is evaporated or goes to the sewer. The slime-control program has been satisfactory. The speed of the machines has been increased and, in spite of this, breaks have become less numerous. The overall result is an increase in production. E.S.

VERNON. Yield considerations in a paper mill. Paper-Maker (London) 117, no. 5: 338-9 (May, 1949).

The efficient re-use of white water in a paper-mill system is discussed, with particular reference to all points where fresh-water additions can be replaced by white water, until a completely closed system with low fiber losses results. Another source of yield losses lies in the overdrying of paper. The natural moisture content of cellulose is between 6 and 7%; yet, in many mills paper is overdried to 4% moisture, accounting for a loss of 3%. E.S.

WOOD

HARPER, V. L. The wood-supply situation in New York State, with special reference to wood for pulping. Paper Trade J. 129, no. 2: 31-5 (July 14, 1949); *cf.* B.I.P.C. 17: 344, 346.

The total production of paper and paperboard in New York State amounted to more than 1.5 million tons annually in recent years. According to Bureau of Census data, a total of 1,862,000 tons of fibrous raw materials was used in 1946, of which 1,030,000 tons were in the form of virgin pulp, composed of about 556,000 tons made within the state, and 474,000 tons brought in

from other states and foreign countries. In addition, 733,000 tons of waste-paper pulp and 99,000 tons of rags and straw were converted. In terms of pulpwood volume, the wood used in manufacturing the pulp amounted to about 700,000 cords, of which 300,000 came from Canada, 100,000 from neighboring states, and 300,000 from New York's own forests. The pulpwood equivalent of the pulp manufactured outside the state represents about 600,000 cords, bringing the total pulpwood equivalent of all the wood pulp consumed within the state to not less than 1,300,000 cords. The State Division of Commerce estimates that the average price of pulpwood at the New York mills in 1939 was about $3.00/cord higher than the corresponding price at competing mills in Maine. Estimates of wood supply (no forest-survey information being yet available), character of forest growth, current annual growth, relationship of growth and drain, and possibilities for obtaining more adequate pulpwood supplies (increased utilization of hardwoods, intensification and expansion of the present forestry program by the State Department of Conservation, and the paper industry's entry into the business of growing more of its own timber) are discussed. 5 diagrams. E.S.

RITCHIE, JAMES L. Long-term outlook for wood pulp. Tappi 32, no. 7: 20A, 22A, 24A, 26A; discussion: 62A, 64A, 66A (July, 1949).

Wood constitutes currently 93% of the volume of fibrous raw material employed in domestic paper and paperboard production. At first restricted to the use of spruce and hemlock, the species' base has now been broadened to the extent that there is scarcely a wood that cannot be converted to pulp by one process or another. Improvements in the conventional, and the development of new, pulping processes has helped to make this broadening possible. The author discusses the world wood supply and the outlook for North America, Europe, Russia, the Southern Hemisphere, and Asia and the Far East based on recent reliable data to the extent they were available. The long term growth of the wood-pulp industry—apart from the population and short-term cyclical factor—will depend upon the extent to which pulp can be converted into products for which an economic demand can be created. Fantastic estimates of future requirements based on present U. S. standards are entirely unrealistic; economic capacity to consume, not sociological requirements, will determine the local level of consumption in the long-term future, as it has in the past. E.S.

WOOD—CHEMISTRY

PEARL, IRWIN A. Wood as a source of chemicals. Paper Mill News 72, no. 31: 15-18 (July 30, 1949).

The author reviews the utilization of wood for producing organic chemicals, with the exception of cellulose from pulping. The products of the destructive distillation of both hard- and softwood, wood hydrolysis, and by-products obtained in sulfite and alkaline pulping (particularly from waste liquors) are considered. R.R.

SOHN, AUGUST WILHELM. Reductic acid as a component of the acid hydrolyzate of wood. Chem. Ber. 82, no. 3: 230-9 (May, 1949). [In German]

In the search for ascorbic acid as a possible component of wood hydrolyzates, reductic acid ($C_5H_6O_3$), melting at 210° (decomposition), was isolated in small amounts from beechwood liquors. The acid was presumably also present in hydrolyzates from spruce- and pinewood. There appears to be no clear relationship between the pentosan or uronic acid content of a wood and the recoverable reductic acid. 17 footnotes. L.E.W.

WOOD—DECAY

LUOSTARINEN, O. V. Logging and storage decay and other damage occurring in saw logs before and during floating. Finnish Paper Timber J. 28, no. 24: 384-8 (Dec. 31, 1946). [In Finnish; English summary]

The author reviews the Swedish research on blue stain and decay of logs before and during floating, which was carried out at the request of the Svenska Cellulosa A. B. The results indicate definitely that barked logs are susceptible to considerable decay both before and after floating; as a result, the value of the timber may be reduced as much as 9%. Decay can be largely avoided with unbarked logs, but such logs have a tendency to sink. Experiments with partial barking (removal in patches of about 20% of the bark in such a manner that an unbroken bark belt remains between the patches) have shown that sinkage and blue-stain troubles may be materially reduced. The results are directly applicable to Finnish conditions. Finnish water legislation, however, does not permit the floating of unbarked wood because of the unfounded assumption that fishing would be impaired. These laws should be altered to permit the floating of partially barked logs, thus preventing considerable timber losses. The final barking could then be carried out in barking machines at the mills. E.S.

WOOD—EXTRACTIVES

ANDERSON, ARTHUR B. Rosin and other extractives from ponderosa pine stumps. Paper Trade J. 129, no. 2: 35-7 (July 14, 1949); *cf.* B.I.P.C. 18: 334.

The examination of well-seasoned ponderosa pine stumps for extractives indicates that this forest waste may be a potential commercial source of rosin, resin, terpenes, and other extractives. Ponderosa pine stumps, which have seasoned eight years and longer, were found to average about 500 pounds of acetone-soluble extractives per ton of stumpwood. The extract consists largely of a rosin, with smaller amounts of gasoline-insoluble resins, and volatile terpenes. Stump removal for extractive recovery and other uses would not only make the cutover and selectively logged areas more adaptable to advanced forest management and improved reforestation practices, but would likewise be another step in further utilization of western pine forest areas. E.S.

ERDTMAN, HOLGER. Compounds inhibiting the sulphite cook. Tappi 32, no. 7: 303-5 (July, 1949); *cf.* B.I.P.C. 14: 155-6.

The possible reactions of lignin that inhibit the pulping of wood by the conventional sulfite process are presented. Phenol compounds have been extracted which are apparently the cause of the indigestibility of wood and function as connecting links between the large lignin molecules. E.S.

ERDTMAN, HOLGER. Heartwood extractives of conifers, their fungicidal and insect-repellent properties and taxonomic interest. Tappi 32, no. 7: 305-10 (July, 1949).

A review (without references) is presented of the heartwood extractives, largely of the family of *Pinaceae*. A few of the tropical woods are also listed. Structural formulas of the known compounds are included. L.E.W.

RENNERFELT, ERIK. Influence of the phenolic compounds in the heartwood of Scots pine (*Pinus sylvestris* L.) on the growth of

some decay fungi in nutrient solution. Svensk Botan. Tid. 39, no. 4: 311-18 (1945). [In English]

Of the phenolic bodies in Scots pine heartwood, pinosylvin is the most universal poison and in a nutrient solution is active at concentrations of 0.02-0.002%. Its methyl ether is more specific and extremely toxic to the fungi *Coniophora puteana* and *Merulius lacrymans,* but has much less effect on *Lentinus lepideus* and *Polyporus annosus.* L.E.W.

RENNERFELT, ERIK. Investigations of thujaplicin, a fungicidal substance in the heartwood of *Thuja plicata* D. Don. Physiol. Plantarum 1: 245-54 (1948). [In English]

The α-, β-, and γ-thujaplicins isolated from western red cedar heartwood were studied. All compounds exhibit strong fungicidal action toward blue stain and toward various wood-decaying fungi. The latter are inhibited by γ-thujaplicin in 0.001-0.002% concentrations. Phenol, similarly tested, inhibited in 0.1-0.2% concentrations. Bluing fungi were completely inhibited in γ-thujaplicin solutions of 0.01-0.02%, whereas partial inhibition was observed in lower concentrations. Of the isomers tested, the β-form was most toxic, and the γ-isomer was slightly more potent than was the α-isomer. The thujaplicins are approximately as active as sodium pentachlorophenol. 12 references. L.E.W.

RENNERFELT, ERIK. Investigations on the capacity of some decay fungi to attack the sap- and heartwood of Scots pine. Medd. Statens Skogsforskningsinstitut 36, no. 9: 1-24 (1947). [In Swedish; English summary]

Samples were taken from the lower parts of the bole of a number of trees, partly from sapwood and in part from the outer and inner heartwood. Blocks of such wood samples were exposed for four months to the action of 10 different fungi. In general, the sapwood was largely destroyed. Variations were found with the heartwood which, in general, appears to be moderately resistant to decay. The outer heartwood is usually the most resistant and only *Lentinus lepideus* succeeded in causing serious attacks in this area. The resistance seems correlated, not with density or width of the annual rings, but rather with the phenolic extractives of the heartwood. When easily attacked sapwood blocks were impregnated with pinosylvin and its methyl ether, such blocks were less subject to attack than were untreated controls. 27 references. L.E.W.

WOOD OPERATIONS

ANON. Timber agreement in Maine. Pulp & Paper 25, no. 8: 52, 54 (July, 1949).

A recent 10-year agreement between Eastern Corp., Brewer, Maine, and the Dead River Co., Bangor, Maine, stipulates that the latter will receive from the former a yearly license fee, in addition to payment for timber cut, which will be reinvested in the construction of a 30-mile road system, forest management studies, and further fire protection for the area. The Eastern Corp. will receive exclusive timber-cutting rights on 100,000 acres, about half of the Dead River holdings. R.R.

X-RAY RESEARCH

HERMANS, P. H., and WEIDINGER, A. Change in crystallinity upon heterogeneous acid hydrolysis of cellulose fibers. J. Polymer Sci. 4, no. 3: 317-22 (1949); *cf.* B.I.P.C. 18: 719-20; 19: 736.

The recently developed x-ray method of crystallinity determination is applied to products of heterogeneous acid hydrolysis of cellulose fibers. Upon treatment of viscose rayon fibers with boiling 2.5 *N* sulfuric acid, the crystalline fraction increases from 39 to 49% within half an hour, and remains constant upon prolonged treatment. Ramie does not show any change in percentage crystallinity when subjected to the same treatment. Its crystalline fraction is, however, transformed into cellulose IV. The observed changes in moisture regain of the hydrolyzed products are in line with the x-ray results. E.S.

KAST, W., and FLASCHNER, L. An x-ray method for the determination of the proportions of crystalline and amorphous substance in cellulose fibers. Kolloid-Z. 111, no. 1: 6-15 (October, 1948); C.A. 43, no. 11: 4461 (June 10, 1949). [In German; abstract in English]

The bases for the estimation of crystalline phases are discussed. For artificial cellulose fibers the relation of background intensity level to the product of the azimuthal and radial intensity distributions in the A_0 maximum affords the determination of the respective amounts of crystalline and amorphous material. For a commercial rayon fiber, the crystalline content was $35 \pm 12\%$. 19 footnotes. E.S.

KAST, W., FLASCHNER, L., and WINKLER, E. Orientation and strength of cellulose fibers. Kolloid-Z. 111, no. 1: 1-6 (October, 1948); C.A. 43, no. 11: 4462 (June 10, 1949). [In German; abstract in English]

The tensile strength of two series of viscose and cuprammonium rayon filaments was correlated with the degree of orientation as deduced from x-ray diffraction diagrams. The degree of orientation was determined by measuring the azimuthal half-width of the A_0 diffraction arc on plots of photometered density *vs.* azimuthal angle. These values, when plotted against percentage elongation for viscose or against tensile strength for cuprammonium rayon, yielded smooth curves with the same minimum half angle. At comparable intermediate orientations, plots of orientation *vs.* resistance to drying were of the same shape, but with the rayon merely displaced toward higher resistance. E.S.

WORK, ROBERT W. The effect of variations in degree of structural order on some physical properties of cellulose and cellulose acetate yarns. Textile Research J. 19, no. 7: 381-93 + 1 col. plate (July, 1949).

X-ray diffraction diagrams indicate that cotton, a highly crystalline and oriented material, gives a triacetate of low crystallinity which may be rendered more crystalline by annealing. This triacetate is partially hydrolyzed to form the secondary cellulose acetate used in textile yarns, which gives an x-ray pattern showing a highly amorphous structure. Although steric effects prevent increases in crystallinity by annealing, this type of yarn can be oriented, the degree of orientation depending upon the conditions under which stretching of the yarn takes place. By swelling and allowing limited mobility, this orientation may be increased over that produced by dry stretching. Cellulose acetate fibers may be converted to highly crystalline celluloses, the orientation of the original material carrying over to a hydrolyzed product. The load-elongation characteristics of families of these two types of yarns are described and the effects of orientation are discussed.

The decrease in lateral strength, caused by orientation, is illustrated by means of electron micrographs of the material. The relationship between orientation in series of cellulose acetate and corresponding celllulose yarns having greater or lesser degrees of orientation and the sonic moduli of these materials are illustrated. Possible explanations are suggested. Dye retention similarities between mature cotton and slightly oriented cellulose yarn on one hand, and immature cotton and unoriented cellulose yarn on the other, indicate that orientation may be one basic difference between mature and immature cottons. E.S.

YEAST

BUTSCHEK, G. The suitability of sulfite waste liquor for production of yeast for human and animal nutrition. Chem.-Ztg. 68, no. 12: 230-3 (Dec. 13, 1944). [In German]

The introductory paragraphs provide a brief, authoritative, and well documented review of the extensive development program for new fast-growing sources of protein carried out under the German "Four Year Plan" by Fink and Lechner of the Institute for Fermentation Industry in Berlin, and by the individual and joint research and development activities of the I. G. Farbenindustrie, Zellstoffabrik Waldhof, and Phrix companies. The Svenska Jästfabrik A. B. is also credited with some of the major developments in new processes for continuous rapid growth of a cheap carbohydrate, utilizing yeast on a commercial scale. The use of various forms of sulfite waste liquor and other inexpensive sources of carbohydrate was a major factor in the success of the basic procedure. After the new method for biological protein synthesis was established, it became necessary to evaluate the product as a desirable material for human and animal nutrition. The paper reviews available knowledge of this subject up to 1944. Particular attention is given to comparisons of yeast grown on beechwood sulfite waste liquor and on wood sugar hydrolyzate with yeast from other sources, such as brewers' and bakers' yeast, and with various conventional sources of protein, such as beef, fish, and milk. General chemical analyses show yeasts from different sources to be rather uniform in moisture, protein, fat, nitrogen-free extract, ash, phosphorus pentoxide, and sulfur content. On the basis of crude protein, 1 kg. dry yeast has been found equivalent to 2.5 kg. lean beef, 2.17 kg. pea meal, 2.38 kg. herring meal, 2.77 kg. fat beef, and 4.16 kg. hens' eggs. Assays by several authors have shown that yeast protein contains all essential amino acids, and that the lysine and cystine content compares favorably with that in accepted food protein products. Different authors have reported analytical results indicating that the amino acid content of yeasts from different sources may vary to some extent. The nonprotein (purine) nitrogen content of yeast has been of some concern, but most authorities agree 10-20 grams dry yeast per day in the human diet can be metabolized safely. Yeasts in general are an excellent source of the B-complex vitamins and may also contain appreciable amounts of Vitamins C and E and of ergosterol (Vitamin D precursor). Feeding tests with swine and ruminants have shown the organic matter of the various yeasts to be well utilized. Digestion coefficients range from 62 to 98% on the organic matter as a whole, from 76 to 91% on the crude protein, from 73 to 90% on the pure protein, from 41 to 114% on crude fat, from 56 to 100% on crude fiber (ruminants), and from 34 to 100% on nitrogen-free extract. The conclusions indicate that yeast is a good useful foodstuff and that yeast grown on sulfite waste liquor by the new aeration method is in no way inferior to yeast grown on other substrates by established methods. 46 references. A.J.W.

Patent Section

Although the abstracts of the United States patents are prepared from the patents themselves, the initial selection of the patents to be abstracted is made from the Patent Gazette *and, therefore, it is possible that the patent section will not contain all patents of potential interest to the industry. The abstracts of the Canadian patents are prepared from the claims published in the* Canadian Patent Office Record. *In so far as possible, an attempt will be made to indicate patents issued in both countries.*

The patent abstracts are listed under the various headings currently used for the abstracts of periodical articles.

Printed copies of United States patents can be obtained from the Commissioner of Patents, Washington, D.C.; the price is 25 cents per copy. Canadian patents up to and including December, 1948, are available only as manuscripts or photostatic copies and an estimate of the cost of a patent should be obtained from the Commissioner of Patents, Ottawa, Canada, in advance of the order. With January, 1949, printed copies of Canadian patents are available at 25 cents per copy of less than 50 sheets of printed matter. For patents of 50 sheets or over, the price is $1.00 per copy. Until the printing branch is in full operation and up to date, the printing of specifications will be several months behind.

BLEACHING—GROUNDWOOD

COLEMAN, WALTER F. Bleaching wood pulp. Canadian patent 458,398. Filed Jan. 6, 1947. Issued July 26, 1949. 4 claims. Assigned to E. I. du Pont de Nemours and Company.

A process for bleaching wood pulp involves centrifuging a low-density wood pulp so as to form a moist, partially dewatered pulp, centrifuging the moist pulp and simultaneously spraying it with a peroxide bleaching solution until a substantial portion of the water in the mass has been replaced by bleaching solution, and maintaining the pulp in a moist condition until bleached. E.G.S.

K'BURG, PAUL B., and REICHERT, JOSEPH S. Bleaching wood pulp. Canadian patent 458,400. Filed March 1, 1947. Issued July 26, 1949. 7 claims. Assigned to E. I. du Pont de Nemours and Company.

A process for bleaching wood pulp includes forming a mist-like dispersion of a peroxygen compound solution in a gas and bringing the dispersion into contact with a high consistency wood pulp initially containing not more than 70% by weight of water. E.G.S.

MILLS, RUSSELL T., and STAUFFER, WILLIAM O. Production of bleached ground wood pulp. Canadian patent 458,399. Filed Feb. 15, 1947. Issued July 26, 1949. 2 claims. Assigned to E. I. du Pont de Nemours and Company.

The process of producing bleached groundwood pulp comprises the incorporation of 50 to 150 p.p.m. of chlorine in the pulp mass, based on the weight of water in the pulp, and the subjection of the pulp mass to bleaching with an oxygen-generating bleaching agent. E.G.S.

BOARD

AUSTIN, ABRAHAM L. Building wall structure. U. S. patent 2,477,111. Filed Dec. 22, 1945. Issued July 26, 1949. 1 claim.

A wall structure is described which is practically moistureproof, contains insulating elements, and is fire-resistant. The board is fabricated from Celotex, an asphalt mastic roofing paper, and a decorative coated composition of Portland cement. E.G.S.

BUCHANAN, CHARLES H., and POLOVTSEFF, BORIS. Composite material for use in structural work and its mode of manufacture. Canadian patent 457,892. Filed Feb. 12, 1947. Issued July 5, 1949. 5 claims. Assigned to Jicwood Limited.

A thermal acoustic insulating material is light and strong; it consists of a low-density core composed of a conglomerate mass formed by drying a wet mixture of hydrated paper pulp and comminuted wood, and a sheet of high-density material which is attached to at least one side of the core. E.G.S.

GALLUP, BRAXTON E. Method of making construction material. U. S. patent 2,475,781. Filed April 20, 1944. Issued July 12, 1949. 2 claims. Assigned to The Ruberoid Co.

A method is provided for making a weatherproof laminated building board having a porous or cellular core which contains a bituminous constituent and is adhesively bonded to the outer liner. E.G.S.

HERITAGE, CLARK C. Surface fluxing coated liner. U. S. patent 2,474,398. Filed April 21, 1943. Issued June 28, 1949. 17 claims. Assigned to Wood Conversion Company.

This patent relates to the fields of water-vaporproofing and thermal insulation; it applies particularly to elements which act to resist the transmission of water vapor. The object of the invention is to flux the surface of asphalt- or bitumen-coated insulating papers by the application of heat; thus pores, pinholes, and other irregularities in the coating are sealed. Radiant heat is applied to attain the fluxing temperature, which is greatest at the exposed surface; in this way greater vapor resistance is imparted to the coat. E.G.S.

BOARD SPECIALTIES

BERGSTEIN, SAMUEL. Process for producing packing structures. U. S. patent 2,474,391. Filed Oct. 26, 1945. Issued June 28, 1949. 5 claims. Assigned to Robert M. Bergstein and Frank D. Bergstein, trustees.

This patent covers a process for making egg box fillers of the conforming type. E.G.S.

BONHAM, LEWIS F. Applicator. U. S. patent 2,476,956. Filed June 18, 1943. Issued July 26, 1949. 3 claims. Assigned to The Personal Products Corporation.

A sanitary, single-use tampon applicator is described, which may also be used as a container. E.G.S.

CRANE, WALTON B., and CRANE, WILLIAM B., JR. Cellular container. U. S. patent 2,476,181. Filed July 30, 1948. Issued July 12, 1949. 9 claims. Assigned to Alpak.

A combination shipping, storage, and display container is formed from a single blank of paperboard material; when assembled, a cellular partitioned structure is provided. E.G.S.

CRARY, JAY D. Handgrip for carriers and cartons. U. S. patent 2,475,014. Filed Aug. 15, 1946. Issued July 5, 1949. 2 claims. Assigned to Paper Strap, Inc.

A carton handle is described which spreads to form a relatively flat wide gripping surface when in use. E.G.S.

GOLLUB, MATTHEW. Bag closure having pressure sensitive adhesive. U. S. patent 2,475,236. Filed Jan. 10, 1945. Issued July 5, 1949. 1 claim.

This patent covers a structure for sealing paper containers or bags. E.G.S.

HAWKINS, WILLIAM H. Ribbon reel made of a single blank. U. S. patent 2,477,333. Filed May 8, 1946. Issued July 26, 1949. 3 claims. Assigned to Freydberg Bros.-Strauss, Inc.

A packaging reel is described which may be assembled from a single blank; it has a central box-like member about which the ribbon is wound. E.G.S.

LOBELL, ROLFE M. Display carton. U. S. patent 2,476,102. Filed Aug. 13, 1948. Issued July 12, 1949. 5 claims. Assigned to Leaf Brands, Inc.

A carton is adapted for shipping and display purposes. E.G.S.

PETERSEN, NELS H. Material packaging. U. S. patent 2,476,623. Filed May 7, 1948. Issued July 19, 1949. 14 claims. Assigned to Addison-Semmes Corporation.

A package for handling and shipping fragile articles consists of an open-sided frame and pallets secured within the frame to prevent movement of the article relative to the frame. E.G.S.

RICHARDSON, RALPH R. Package and tray therefor. Canadian patent 458,201. Filed April 11, 1947. Issued July 19, 1949. 5 claims. Assigned to Chicago Carton Company.

A packaging tray consists of a paperboard member having integrally connected bottom and end portions which co-operate to form a main tray. E.G.S.

SANFORD, ROY S. Container. U. S. patent 2,476,948. Filed Feb. 3, 1945. Issued July 19, 1949. 22 claims. Assigned to Autoyre Company, Incorporated.

The invention is applicable to cartons, trays, or boxes made from paperboard or the like, but particularly covers the manufacture of open-topped sheet metal containers such as soap dishes and combined tumbler and toothbrush holders. A suitable sheet of material is slit to form a number of tongues having free inner ends; the slits terminate short of the edges of the sheet, leaving unslit marginal portions. In making paperboard cartons or containers, the edge portions may be bent into face-to-face contact with the tongues and adhesively joined. E.G.S.

VARNER, ALVIE E. Bending process. Canadian patent 457,899. Filed Oct. 7, 1947. Issued July 5, 1949. 17 claims. Assigned to Masonite Corporation.

A process for making integral angular hard fiberboard products comprises hot-pressing a blank fiber sheet along a line, bending the blank at the line, and hot-pressing the angular structure in position. E.G.S.

CELLULOSE—OXYCELLULOSE

DOUB, LEONARD. Cellulosic products. U. S. patent 2,474,306. Filed Feb. 23, 1945. Issued June 28, 1949. 6 claims. Assigned to Parke, Davis & Company.

New compositions and methods are given for preparing products from partially oxidized cellulose. An object of the patent is the preparation of oxidized cellulose compositions which are useful in making surgical dressings and which have exceptional lyophilic properties. Another object is the preparation of new germicidal surgical dressings. Several methods are given for the compounding of cellulosic products. E.G.S.

CHLORINE DIOXIDE

HUTCHINSON, WILLIS S. Method of preparing chlorine dioxide. U. S. patent 2,475,285. Filed July 12, 1944. Issued July 5, 1949. 5 claims. Assigned to Mathieson Chemical Corporation.

This is equivalent to Canadian patent 443,861; *cf.* B.I.P.C. 18: 132. E.G.S.

HUTCHINSON, WILLIS S. Method of preparing chlorine dioxide. U. S. patent 2,475,286. Filed July 12, 1944. Issued July 5, 1949. 5 claims. Assigned to Mathieson Chemical Corporation.

This is equivalent to Canadian patent 443,860; *cf.* B.I.P.C. 18: 132. E.G.S.

DISPENSING CONTAINERS

GLUCK, FRED C. Carton. U. S. patent 2,474,783. Filed April 8, 1946. Issued June 28, 1949. 3 claims. Assigned to Minerva Wax Paper Company.

This patent relates to dispensing cartons for sheet material such as wax paper in roll form and particularly to the locking mechanism for securing the carton and its cover in a closed position. E.G.S.

THOMPSON, CLAUDE H. Dispensing container. U. S. patent 2,474,076. Filed Dec. 17, 1946. Issued June 21, 1949. 7 claims.

This patent covers a dispensing container for paper rolls. E.G.S.

FOLDING BOXES

ABBOTT, JOHN C. Self-locking coin box. U. S. patent 2,475,441. Filed May 26, 1948. Issued July 5, 1949. 6 claims.

A self-locking coin bank is made from two blanks of material, such as paper or cardboard, and adapted for shipment in the collapsed condition. E.G.S.

BURGOON, JOSEPH P. Container. U. S. patent 2,476,583. Filed June 30, 1948. Issued July 19, 1949. 5 claims.

Paperboard containers which are adapted to the packaging and deep-freezing of fruits and other foods are so constructed that they may be internested after assembly and prior to filling; ventilating openings are provided between adjacent sidewalls. E.G.S.

DUNNING, ROBERT M. Corner lock construction. U. S. patent 2,475,279. Filed Aug. 12, 1944. Issued July 5, 1949. 7 claims. Assigned to Waldorf Paper Products Company.

A construction is described for corners which are so locked together that outward pressure upon the carton walls can not open the box without tearing. E.G.S.

GUYER, REYNOLDS. Carton. U. S. patent 2,474,476. Filed Dec. 9, 1944. Issued June 28, 1949. 4 claims. Assigned to Waldorf Paper Products Company.

A provision is made for forming a tightly sealed glued-end carton. An object of the invention lies in pressing two opposed side walls of the carton inwardly near the upper end of the box; thus is provided a substantially triangular shoulder against which each edge of the opposed sealing flaps may rest during the sealing process. This action tends to fold one end of the carton to some extent so that the end of the carton is not flat. In this way the edges of the opposed sealed flaps engage the triangular shoulders which are provided by the folding operation, permitting sealing pressure to be applied to the end of the carton. A feature lies in the fact that the top of the carton may be folded so as to present no raw edges of the carton stock within the container. E.G.S.

GUYER, REYNOLDS. Triple-edge reclosing carton. U. S. patent 2,474,523. Filed June 16, 1945. Issued June 28, 1949. 3 claims. Assigned to Waldorf Paper Products Company.

Provision is made for a tubular carton having a triple-thickness edge at one end of the body. The carton body is glued in tubular form while flat and may be shipped in the collapsed form. When desired for use the carton may be filled and sealed in the usual manner and on the usual apparatus. E.G.S.

MCLELLAN, RODERICK I. Flower holder and box. U. S. patent 2,474,543. Filed April 2, 1948. Issued June 28, 1949. 5 claims. Assigned to E. W. McLellan Co.

A combination flower holder and display container is so constructed that jostling during shipment and handling is prevented; the flowers are held in position for display without rearrangement. E.G.S.

MORAND, EMIL. Foldable compartment box. U. S. patent 2,474,751. Filed March 21, 1946. Issued June 28, 1949. 4 claims.

Provision is made for a multicompartment box formed from a blank of paper stock which is shaped and scored to provide foldable sections. E.G.S.

RAFOTH, BENNIE A. Carton. U. S. patent 2,475,294. Filed Sept. 20, 1946. Issued July 5, 1949. 1 claim. Assigned to Marathon Corporation.

A package or carton is provided with means for retaining a spoon within the package. E.G.S.

RINGLER, WILLIAM A. Folding carton having reclosable pouring spout. U. S. patent 2,475,677. Filed Dec. 7, 1946. Issued July 12, 1949. 3 claims. Assigned to The Gardner Board and Carton Co.

A pouring spout is described for which the opening is confined to one wall of the carton; thus, none of the contents are spilled during pouring. E.G.S.

VAN ROSEN, ROBERT. Receptacle. U. S. patent 2,476,253. Filed Feb. 5, 1948. Issued July 12, 1949. 10 claims.

A corner-lock construction provides for securing the ends and sides of a box or tray blank in corner-forming relation. E.G.S.

FUEL

FOSNAESS, GEORG. Briquette for lighting fires. U. S. patent 2,477,174. Filed July 2, 1947. Issued July 26, 1949. 3 claims.

A method is described for making briquets for lighting fires; hard-pressed wood cardboard blocks are soaked for about 15 minutes in a fluid consisting of 80% Diesel oil, 15% thick cod liver oil, and 5% tar. E.G.S.

WILLIAMS, RALPH O., and BREDLIK, VLADIMIR. Artificial fuel made from paper. U. S. patent 2,475,766. Filed April 30, 1946. Issued July 12, 1949. 5 claims. Assigned to Williams-Bauer Corporation.

An artificial fuel is made from waste paper in the form of logs or briquets and has substantially the physical properties, burning qualities, and heating value of wood fire logs. E.G.S.

WILLIAMS, RALPH O., and BREDLIK, VLADIMIR. Method of extruding paper to form artificial fuel logs. U. S. patent 2,475,768. Filed Nov. 10, 1947. Issued July 12, 1949. 2 claims. Assigned to Williams-Bauer Corporation.

An artificial fuel is manufactured from paper by extrusion into a continuous form-retaining mass which is separable into logs or briquets. E.G.S.

WILLIAMS, RALPH O., and BREDLIK, VLADIMIR. Method of making artificial fuel from paper. U. S. patent 2,475,767. Filed April 30, 1946. Issued July 12, 1949. 1 claim. Assigned to Williams-Bauer Corporation.

A method is given for treatment of waste paper in the manufacture of artificial logs or briquets. E.G.S.

WILLIAMS, RALPH O., and BREDLIK, VLADIMIR. Method of making artificial fuel logs from paper. U. S. patent 2,475,769. Filed Nov. 10, 1947. Issued July 12, 1949. 8 claims. Assigned to Williams-Bauer Corporation.

Waste paper is treated for use in the manufacture of artificial logs or briquets. E.G.S.

INTERIOR PACKING

SOGAS, CHRISTOS M., and SOGAS, SAM M. Packaging for candy canes. U. S. patent 2,476,923. Filed Feb. 24, 1948. Issued July 19, 1949. 2 claims.

Provision is made for packaging candy canes so that long distance shipments can be made with little breakage; the canes are gathered in continuous spiral bundles with the aid of strips of 35 to 50 pound corrugated paper and sealed with an adhesive strip. E.G.S.

MACHINERY—CONVERTING MACHINERY

BOGOSLOWSKY, BORIS. Apparatus for making convolute wound tubing from sheet material. Canadian patent 458,153. Filed May 19, 1947. Issued July 19, 1949. 17 claims.

An apparatus for making convolute-wound tubing from sheet material consists of a mandrel, a stationary table, and a driven rolling member; the sheet is engaged between the roller and mandrel and wound around the mandrel. E.G.S.

BOGOSLOWSKY, BORIS. Apparatus for making convolute wound tubing from sheet material. Canadian patent 458,154. Filed May 19, 1947. Issued July 19, 1949. 5 claims.

An apparatus for making convolute-wound tubing from sheet material comprises a pair of rollers journalled in side frames, a pair of plates pivotally mounted on the frames, and a second pair of rollers journalled in the plates; one or the other of the second pair of rollers may be shifted into winding position opposite the fixed rollers. E.G.S.

EATON, LEWIS B. Apparatus for producing bags. U. S. patent 2,475,950. Filed Oct. 2, 1945. Issued July 12, 1949. 4 claims. Assigned to Pneumatic Scale Corporation, Limited.

This is equivalent to Canadian patent 447,045; *cf.* B.I.P.C. 18: 567. E.G.S.

HENRY, SHALA W. Registering device for envelope blanks. U. S. patent 2,474,944. Filed Jan. 12, 1946. Issued July 5, 1949. 5 claims. Assigned to Boston Envelope Co.

Each envelope blank is correctly positioned in a registering device before it is fed to the creasing mechanism; thus it is insured that the creases in each envelope blank are correctly located. E.G.S.

IRMSCHER, HANS O. Infusion package manufacture. U. S. patent 2,475,617. Filed July 9, 1942. Issued July 12, 1949. 15 claims. Assigned to National Urn Bag Co., Inc.

A machine comprises a combination of mechanisms for automatically performing all operations necessary to manufacture infusion packages and to deliver the bags continuously in counted groups ready for packing. E.G.S.

MEAD, HARRY A. Mechanism for cutting, folding, and sealing the bottoms of bags. U. S. patent 2,476,057. Filed June 17, 1946.

Issued July 12, 1949. 2 claims. Assigned to Kono Mead Equipment Corporation.

A mechanism is provided for cutting, folding, and heat-sealing the bottoms of bags during the manufacturing process. E.G.S.

PIAZZE, THOMAS E. Container forming machine and method. U. S. patent 2,475,359. Filed Nov. 14, 1947. Issued July 5, 1949. 49 claims. Assigned to Shellmar Products Corporation.

A machine and method are described for forming a container which holds a pellet or capsule of dispersible material for coloring the contents of the container when it is filled with a semisolid, viscous, or plastic mass of oleaginous material such as oleomargarine. A description is given of the machine and method for making heat-sealable containers of tube-like construction which are transversely sealed at one end and which have a capsule or pellet secured to the inner wall. Various details of the machine are given. E.G.S.

MACHINERY—CORRUGATING MACHINE

KUNZ, BERNARD P. Method and machine for making corrugated structures. U. S. patent 2,475,789. Filed June 25, 1946. Issued July 12, 1949. 19 claims.

A machine and method are described for making a corrugated structure in the form of a panel. E.G.S.

MACHINERY—CUTTERS

FISHER, DONALD B., and BRYCE, JAMES. Paper lifting device for cutting machines and the like. Canadian patent 457,764. Filed April 30, 1947. Issued July 5, 1949. 6 claims.

A paper stock lifting device provides means for raising the paper stock to be fed into the cutting machine and for lowering the stock from the machine. E.G.S.

SHERMAN, JOHN Q. Strip trimmer. U. S. patent 2,476,326. Filed Aug. 3, 1940. Issued July 19, 1949. 48 claims.

A paper-trimming apparatus removes the margins from continuous strips of marginally punched material; it is specified for use with computing and addressing machines. E.G.S.

MACHINERY—DOCTORS

LJUNGQUIST, ERNST R. Doctor mechanism for rolls and cylinders. U. S. patent 2,477,339. Filed Feb. 14, 1945. Issued July 26, 1949. 2 claims. Assigned to Lodding Engineering Corporation.

Provision is made for a doctor blade holder, so constructed that auxiliary pressure can be applied in varying amounts to localized areas of the free or back edge of the blade; thus, the blade fits closely to the surface being doctored. E.G.S.

MACHINERY—HEAD BOX

SMITH, DREXEL V., and MILES, GEORGE W. Paper making method and machine. Canadian patent 458,001. Filed April 21, 1947. Issued July 12, 1949. 7 claims.

A papermaking machine consists of a Fourdrinier belt-incorporating apparatus and a vertically elongated paper pulp-supplying headbox; the headbox discharges from a point above the belt. E.G.S.

MACHINERY—MIXING APPARATUS

ROSMAIT, JOHN A. Paper pulp agitator. Canadian patent 458,104. Filed March 2, 1948. Issued July 12, 1949. 2 claims. Assigned to D. J. Murray Manufacturing Co.

This is equivalent to U. S. patent 2,470,267; *cf.* B.I.P.C. 19: 743. E.G.S.

MACHINERY—PACKAGING MACHINERY

MACKENZIE, WILLIAM E. Cartoning machine. Canadian patent 458,022. Filed Aug. 25, 1947. Issued July 12, 1949. 10 claims.

A cartoning machine is described for folding soft articles in carton blanks without deformation of the article. E.G.S.

MACHINERY—PASTING MACHINE

CHARLES, GEORGE K. Apparatus for applying adhesive strip to cans or other containers. U. S. patent 2,475,076. Filed March 3, 1948. Issued July 5, 1949. 8 claims.

An apparatus is described for applying adhesive strip to cans or containers of circular, rectangular, or irregular cross-secton. E.G.S.

MACHINERY—REFINERS

ARPIN, EDMUND P., JR. Rotary refiner. U. S. patent 2,475,869. Filed Jan. 12, 1946. Issued July 12, 1949. 10 claims.

This is equivalent to Canadian patent 445,554; *cf.* B.I.P.C. 18: 413. E.G.S.

MACHINERY—SHEET-FEEDING MECHANISM

BACKHOUSE, HEADLEY T. Sheet separating mechanism. U. S. patent 2,476,577. Filed May 26, 1948. Issued July 19, 1949. 15 claims.

A mechanism separates and feeds sheets of paper or card, one at a time, from the top of a stack to a printing or other machine. E.G.S.

MACHINERY—SLITTERS AND WINDERS

CLEM, EVERETT W., and MUNTON, JOHN P. Paper winding machine. U. S. patent 2,475,480. Filed Nov. 15, 1946. Issued July 5, 1949. 6 claims. Assigned to Rice Barton Corporation.

Improvements in paper-winding machines, particularly in that type of paper-winding machine known as a "Pope Reel" winding machine, are described. The primary object is the provision of a paper-winding machine with means for rotating and raising the empty winding roll to a suitable angular velocity before lowering the roll against a moving paper web. A further object is the provision of an accelerating mechanism which may be so constructed and arranged that it will not interfere with the normal operation of a "Pope Reel" paper-winding machine. E.G.S.

LANGBO, GEORG. Winding machine for paper rolls. Canadian patent 458,293. Filed April 5, 1947. Issued July 26, 1949. 5 claims.

An automatic winding machine for making paper rolls consists of several winding spindles for the consecutive winding of one roll after another, a continuously rotating drum structure which supports the spindles, means for automatically cutting the paper web upon completion of winding of a roll, and means for removing the completed roll from the winding spindles. E.G.S.

MACHINERY—THICKENERS

BREYFOGLE, ROY H. Apparatus for dewatering papermaking stock. U. S. patent 2,476,131. Filed Jan. 31, 1946. Issued July 12, 1949. 1 claim. Assigned to Cheney Bigelow Wire Works Incorporated.

Methods and apparatus for thickening or dewatering papermaking material are claimed; they are preferably used in connection with apparatus which is similar to a cylinder machine. E.G.S.

ELLILÄ, KARL L. Filtering apparatus. Canadian patent 458,281. Filed Sept. 21, 1946. Issued July 26, 1949. 8 claims.

A filtering apparatus consists of a vat adapted to contain the liquid to be filtered, a rotatable filtering drum, a trough for containing a pulp suspension, a rotatable means for passing a layer of pulp from the trough to the exterior surface of the filtering drum, and a rotatable means for removing the pulp layer after its passage through the liquid to be filtered. E.G.S.

MACHINERY—VORTEX-TYPE DIRT SEPARATOR

BERGES, ANDRÉ C. Vortex type separator for paper pulp. Canadian patent 458,271. Filed April 10, 1948. Issued July 26, 1949. 13 claims.

A vortex-type separator for paper pulp consists of several upright cylindrical vortex vessels, each having, at the upper end, a tangential inlet for pulp and a central outlet for withdrawing purified pulp; each of the vortex vessels has a tangential side outlet for discharging dirt-laden liquid from its annular dirt-collecting zone. E.G.S.

MACHINERY—WEB TENSION CONTROL

BONEBRAKE, GAY M. Tension control mechanism. U. S. patent 2,475,691. Filed Nov. 2, 1945. Issued July 12, 1949. 4 claims. Assigned to Wm. Wrigley Jr. Company.

A control mechanism regulates the tension of a moving web by speed variation of a web-feeding roll at one end of the web. E.G.S.

PAPER—COATED

ENDER, CLARENCE D. Coating composition. Canadian patent 458,215. Filed Jan. 15, 1945. Issued July 19, 1949. 7 claims. Assigned to Hercules Powder Company.

This is equivalent to U. S. patent 2,423,555; *cf.* B.I.P.C. 17: 740. E.G.S.

ROEHM, WILLIAM A. Web coating apparatus. U. S. patent 2,474,691. Filed March 20, 1946. Issued June 28, 1949. 12 claims. Assigned to Virtu, Inc.

In a method of and apparatus for coating web stock, such as paper or other materials, the stock is fed along a predetermined path past a coating station where a coating material is applied to the web. The object of this invention is the provision for a more efficient and economical method for handling heavy or viscous coating materials and for applying them to a traveling web so as to produce a uniform coating of the desired thickness on the web. The coating material is fed to an outlet through a passage leading from a reservoir containing the coating material. One or more of the walls of this passage moves in the direction of the outlet; contact with the coating material and the friction between the moving passage and the material is utilized to feed the coating material through the passage to the outlet. As the coating material leaves the outlet, it is applied to the traveling web; the thickness of the coating is controlled by regulating the distance between the outlet and the web. E.G.S.

WALKER, JOSEPH E. Method of and apparatus for surfacing paper from continuous web. Canadian patent 457,856. Filed June 5, 1945. Issued July 5, 1949. 2 claims. Assigned to Dominion Envelope Company Limited.

A method of finishing paper comprises application of a moistened coating to one surface, bringing the moist surface into contact with a smooth finishing roll, heating the coating to near dryness, and stripping the paper from the roll, thus forming a smooth coated paper surface. E.G.S.

PAPER SIZING

MORRIS, BERT M. Process for preparing a dry rosin size. U. S. patent 2,476,450. Filed March 5, 1946. Issued July 19, 1949. 5 claims. Assigned to Hercules Powder Company.

Gum rosin is isomerized in the molten state and in the absence of a solvent by treatment with a catalytic amount (0.01-0.10%) of sulfuric or *p*-toluenesulfonic acid; it is then completely saponified with caustic followed by spray-drying; the resulting rosin size is more stable toward oxidation than a similar size made from untreated gum rosin. E.G.S.

PAPER SPECIALTIES

CROSS, WILLIAM W. Disposable caul plate. Canadian patent 458,230. Filed July 25, 1946. Issued July 19, 1949. 4 claims. Assigned to Paper Patents Company.

Plastic-surfaced panels are made by loading a sheet of cellulosic material with a heat-moldable plastic, attaching a sheet of thin, flexible, resin-impermeable material to one surface of the loaded sheet, and bonding the sheet to the panel in a platen press with the application of heat and pressure. E.G.S.

FARRELL, ROBERT A., and WAGNER, CHARLEY L. Heat-sealable sheet material. U. S. patent 2,474,619. Filed Jan. 22, 1944. Issued June 28, 1949. 10 claims. Assigned to Marathon Paper Mills Company.

A heat-sealable sheet material contains a microcrystalline wax composition which is activated and brought to the surface to provide an adhesive film when heat and pressure are applied to any selected area. E.G.S.

JAMES, BILL Y. Package wrapping. U. S. patent 2,475,323. Filed Nov. 3, 1944. Issued July 5, 1949. 4 claims.

This invention covers a preformed package wrapping which may be placed about a package of predetermined size and shape. E.G.S.

KARFIOL, EDWARD, and ROEHM, WILLIAM A. Decorative shelf-edging. U. S. patent 2,477,300. Filed May 12, 1945. Issued July 26, 1949. 5 claims. Assigned to Virtu, Inc.

Printed paper stock is laminated with transparent plastic material; the resulting structure is passed through embossing and impressing rolls. E.G.S.

KRALL, WALTER. Envelope. U. S. patent 2,476,740. Filed April 26, 1947. Issued July 19, 1949. 1 claim. Assigned to United States Envelope Company.

An envelope is adapted to the packaging of surgical or medical bandages which must be maintained in a sterile and uncontaminated condition. E.G.S.

MOHR, WILFRED J. Method of making pressure-sensitive adhesive sheeting. U. S. patent 2,477,196. Filed June 12, 1945. Issued July 26, 1949; Canadian patent 458,429. Filed June 11, 1946. Issued July 26, 1949. 5 claims. Assigned to Minnesota Mining & Manufacturing Company.

A method is described for applying a water-dispersed adhesive as an intercalated layer between two moisture-permeable backing sheets, removing the water from the interior of the composite by evaporation, and separating the two adhesive sheets thus formed by splitting the adhesive layer at its approximate center. E.G.S.

NEUMANN, SALOMON. Pregummed paper, fabric, and other materials. U. S. patent 2,477,344. Filed Feb. 20, 1945. Issued July 26, 1949. 2 claims. Assigned one half to Shand Kydd Limited.

This is equivalent to Canadian patent 456,245; *cf.* B.I.P.C. 19: 675. E.G.S.

OSBORNE, FAY H. Synthetic fiber paper. U. S. patent 2,477,000. Filed Aug. 22, 1946. Issued July 26, 1949. 6 claims. Assigned to C. H. Dexter & Sons, Inc.

This is equivalent to Canadian patent 454,001; *cf.* B.I.P.C. 19: 450. E.G.S.

ROSEN, SHY. Art of manufacturing composite commodity wrappers. U. S. patent 2,475,052. Filed Sept. 8, 1947. Issued July 5, 1949. 3 claims. Assigned to Milprint, Inc.

This patent covers a reclosable composite bread wrapper of the telescopic separable-section type. E.G.S.

ROSEN, SHY. Reclosable bread package having tear strip and reinforcing member. U. S. patent 2,476,564. Filed July 5, 1946. Issued July 19, 1949. 2 claims. Assigned to Milprint, Inc.

This is equivalent to Canadian patent 454,311; *cf.* B.I.P.C. 19: 450.
E.G.S.

ROTE, JOHN G., JR. Container closure. U. S. patent 2,476,627. Filed April 6, 1948. Issued July 19, 1949. 5 claims. Assigned to Sun Chemical Corporation.

A coated paper liner is specified for use as a component of crown caps, screw caps, and similar closures and as a facing material for the inside of paper containers. E.G.S.

ROWE, WILLIAM W. Method of making waterproof and moisture-vaporproof packages. U. S. patent 2,476,325. Filed April 23, 1943. Issued July 19, 1949. 10 claims. Assigned to Cincinnati Industries, Inc.

A package is provided which protects its contents from water upon submersion, even at considerable pressures; it also has high resistance to the passage of moisture-vapor through the body material, seams, and closure. The package is essentially a bag made from paper creped by the positive adhesive action of a suitable binder such as bitumen or some other thermoplastic or adhesive substance. E.G.S.

SLIFKIN, SAM C. Diazotype sensitized papers having cellulose ether sizing. U. S. patent 2,474,700. Filed March 27, 1946. Issued June 28, 1949. 3 claims. Assigned to General Aniline & Film Corporation.

This is equivalent to Canadian patent 454,396; *cf.* B.I.P.C. 19: 522.
E.G.S.

THAYER, MARY E. Method of rendering materials water-repellent. U. S. patent 2,474,704. Filed Aug. 11, 1948. Issued June 28, 1949. 8 claims. Assigned to Dow Corning Corporation.

A method is provided for rendering surfaces water-repellent, retarding the deliquescence of water-soluble materials, hydrophobing materials to obviate the use of toxic or corrosive agents, and improving the moisture resistance of foodstuffs. The solid material is treated with monomethyldiethoxysilane vapors and heated to a temperature between 30 and 300° C.; this should be below the decomposition temperature and melting point of the treated substance. The heating process usually increases the moisture resistance of the contacted material. E.G.S.

WEIDNER, CHARLES L., and EGER, LASZLO W. Adhesive tape for laminating. U. S. patent 2,474,292. Filed Aug. 13, 1943. Issued June 28, 1949. 3 claims. Assigned to Industrial Tape Corporation.

This is equivalent to Canadian patent 453,289; *cf.* B.I.P.C. 19: 373.
E.G.S.

WEST, WILFRED H. Paper towel. U. S. patent 2,477,223. Filed Jan. 19, 1948. Issued July 26, 1949. 5 claims.

A paper towel is described which is not interfolded or interleaved with the adjacent towels in the dispensing cabinet, but is merely folded upon itself; it is possible to remove a single towel without withdrawing succeeding ones. The shape of the new towel permits its use in present dispensers. E.G.S.

YOUNT, STANLEY G., and HALSTEAD, PAUL R. Bag and method of making the same. U. S. patent 2,474,770. Filed May 15, 1944. Issued June 28, 1949. 7 claims. Assigned to Southland Paper Converting Company.

A bag construction is provided in which bags of large circumference with a deep bottom gusset may be manufactured by a continuous mechanical process from large rolls of paper such as the jumbo roll. Such bags would be suitable for covering items such as divans and armchairs and for lining boxes and cartons. E.G.S.

SETUP BOXES

VOGT, LUCIEN E. Box. U. S. patent 2,477,530. Filed May 26, 1948. Issued July 26, 1949. 4 claims. Assigned to Farrington Manufacturing Company.

A method is covered for constructing boxes of various sizes, shapes, and materials, having external strengthening frames or members at the corners and along various edges. E.G.S.

SHIPPING CONTAINERS

BEACH, RALPH L., JR. Shipping package. U. S. patent 2,474,968. Filed Nov. 16, 1946. Issued July 5, 1949. 5 claims. Assigned to International Paper Company.

The construction of a shipping carton for use in the transportation of refrigerators is described; the carton may be assembled about a refrigerator and its mounting skid. E.G.S.

NEWSOM, KITCHENER K. Shipping box. U. S. patent 2,475,107. Filed March 6, 1945. Issued July 5, 1949. 6 claims.

A fiberboard box construction includes means for preventing objectionable bulging of the bottom of the box. E.G.S.

NOTAR, CAMILLE J. Chick sorting and shipping box. U. S. patent 2,475,913. Filed Aug. 28, 1946. Issued July 12, 1949. 1 claim. Assigned one half to Raymond H. Notar.

A cardboard shipping box is divided by partitions into sorting and counting compartments for baby chicks; the box has a friction-type closing lid which is perforated for ventilation. E.G.S.

RABKIN, WILLIAM. Container for photographic plates. U. S. patent 2,476,767. Filed Oct. 16, 1947. Issued July 19, 1949. 3 claims.

A lightproof container is used for the storage and shipment of photographic plates, as well as a plate magazine in automatic cameras. The plate-retaining string acts as a drawstring with which to tear the paper wrapper for removal of the cover without discharging the plates from the casing. A similar container is covered in U. S. patent 2,286,010, issued June 9, 1942. E.G.S.

SULFITE WASTE LIQUOR

DAWSON, REGINALD D. Fluid for drilling wells. U. S. patent 2,476,845. Filed June 7, 1946. Issued July 19, 1949. 4 claims. Assigned to Shell Development Company.

A drilling emulsion is described which is stable in the presence of contaminating formation salts or brines and is formed from lignosulfonic acid emulsifying agents. E.G.S.

MCCARTHY, JOSEPH L. Production of useful products by microorganisms acting upon prepared sulphite waste liquor. Canadian patent 458,025. Filed May 26, 1947. Issued July 12, 1949. 12 claims.

This is the same as U. S. patent 2,430,355; *cf.* B.I.P.C. 18: 279. E.G.S.

TALL OIL

DRAMAN, REXFORD E. Method of producing GR-S latex containing carbon black. U. S. patent 2,476,819. Filed April 30, 1945. Issued July 19, 1949. 1 claim. Assigned to The Firestone Tire & Rubber Company.

A process is described for producing a synthetic latex by polymerization in the presence of carbon black. A hydrocarbon-soluble catalyst partly counteracts the retarding effect of the carbon black on the polymerization reaction. Sulfonated tall oil is an ingredient of the black suspension. E.G.S.

TEXTILE INDUSTRY AND FABRICS—FIREPROOFING

LEATHERMAN, MARTIN. Combustion retarding coating composition. U. S. patent 2,475,626. Filed Sept. 24, 1945. Issued July 12, 1949. 5 claims.

A fire-retarding or fire-resistant coating is specified for combustible fibrous materials; it is applicable to cotton, rayon, wool, silk, and the like. The coating composition includes acrylate or methacrylate ester polymers, polyvinyl chloride or a co-polymer of vinyl acetate and vinyl chloride, zinc oxide, and an opaque pigment. E.G.S.

TEXTILE INDUSTRY AND FABRICS—ROTPROOFING

BENIGNUS, PAUL G. Fungus-proofing composition. U. S. patent 2,476,235. Filed Aug. 11, 1944. Issued July 12, 1949. 13 claims. Assigned to Monsanto Chemical Company.

A process is described by which textiles, cordage, paper, wood, and other cellulosic materials may be impregnated with sufficient insoluble fungicidal agent in a single immersion to render the subsequently dried cellulosic material permanently resistant to fungus and bacteria. The fungicide consists of a water-in-oil emulsion; the oil phase contains a relatively water-insoluble fungicidal agent, such as copper 8-hydroxyquinoline, a modified alkyd resin having a relatively high ratio of fatty acid residue to phthalic anhydride residue, and a mixture of chlorinated diphenyls. E.G.S.

TRANSPARENT CONTAINERS

RICE, FRANCIS G. H. Container. Canadian patent 458,347. Filed Dec. 20, 1947. Issued July 26, 1949. 3 claims. Assigned to Canadian Industries Limited.

A display box has a transparent lid and a container portion with mirrored inner surfaces. E.G.S.

WET STRENGTH

DANIEL, JOHN H., JR., HASTINGS, RANDALL, WILSON, LUCIUS H., and LANDES, CHESTER G. Application of dispersed coating materials to cellulosic fibres. Canadian patent 458,318. Filed April 17, 1947. Issued July 26, 1949. 20 claims. Assigned to American Cyanamid Company.

A method of impregnating fibrous cellulosic material with an organic impregnating agent while preserving the freeness and felting properties of the material includes preparing a water suspension of the cellulosic material at 0.5-6.0% consistency, adding to the suspension a cationic polyamine-halohydrin resin in amounts equal to 1-20% of the weight of the organic impregnating agent, allowing the suspension to stand at a pH of about 3 to 8 for at least 30 minutes, adding an aqueous dispersion containing the impregnating agent in deflocculated condition, and flocculating the impregnating agent in the presence of the suspended cellulosic fibers by the action of the cationic polyamine-halohydrin resin, thus depositing a substantial proportion of the impregnating agent uniformly on the fibers. E.G.S.

VAN DYKE, ORIEN W. Method and means of preventing fluid loss through porous walls. U. S. patent 2,477,219. Filed March 21, 1947. Issued July 26, 1949. 5 claims. Assigned to Magnet Cove Barium Corporation.

A method and product are given for preventing or reducing the loss of fluid from the well bore into the surrounding formations. A mass of water-insoluble cellulose fibers (comminuted wet-strength paper sized with bentonite) is specified for addition to the drilling mud; the fibers are sufficiently porous that they will permit the passage of water but will retain the comminuted material ordinarily carried by drilling fluid. A cake is formed over the porous formation so that subsequent washing of the drilling fluid past the formation will not displace the materials closing off the porous wall. E.G.S.

WOOD TRANSPORTATION

NORDBERG, OSCAR, and SNOW, CHARLES B. Stake for logging truck bunks. U. S. patent 2,475,753. Filed July 22, 1946. Issued July 12, 1949. 5 claims.

Bunk stakes are described which are sufficiently strong to retain extremely heavy loads; a locking device is also provided which permits the stakes to release the load only when it is operated intentionally. E.G.S.

AUTHOR INDEX TO BOOKS

American Boxmaker 833
American Chemical Society. *Division of Rubber Chemistry* 832
The American Society of Refrigerating Engineers 832
Amis, E. S. 831
Blättler, W. 831
Blout, E. R., ed. 832
Burk, R. E., ed. 832
Curtiss, L. F. 832
DeLollis, N. J. 831
Friedlander, G. 832
Grummitt, O., ed. 832
Hohenstein, W. P., ed. 832
Horsfall, R. S. 831
Kennedy, J. W. 832
Lawrie, L. G. 831
Lithographic Technical Foundation, Inc. 831
Mark, H., ed. 832
Montgomery, C. G., ed. 832
National Advisory Committee for Aeronautics 831
Northeastern Wood Utilization Council, Inc. 831
Paper Makers' Association of Great Britain and Ireland. *Technical Section. Education Committee* 831
Ragan, G. L., ed. 832
Reed, R. F. 831
Rucker, N. 831
Smedley, E., ed. 832
Social Science Research Council 832
Strome, G. 832
U. S. Bureau of the Census 832
U. S. National Bureau of Standards 832
U. S. Tariff Commission 831
Walden, Sons & Mott, Inc. 833
Wier, J. E. 831
Wild, F. 831
Writer's Program of the Work Projects Administration in the Commonwealth of Pennsylvania 832

AUTHOR INDEX TO ABSTRACTS

The letter P preceding a page number indicates a patent abstract.

Aanensen 859
Abbott, J. C. ..... P 889
Addison-Semmes Corporation ..... P 888
Adrian, A. 879
Alpak ..... P 887
American Cyanamid Company ..... P 901
Anderson, A. B. 882
Appling, J. W. 857
Arend, A. G. 867
Aronovsky, S. I. 875
Arpin, E. P., Jr. ..... P 894
Austin, A. L. ..... P 887
Autoyre Company, Incorporated ... P 888
Backhouse, H. T. ..... P 894
Backman, A. 841
Ballou, J. W. 866
Beach, R. L., Jr. ..... P 899
Beatty, J. R. 867
Bechtel, W. G. 874
Benignus, P. G. ..... P 900
Berges, A. C. ..... P 895
Bergli, S. L. 859
Bergstein, F. D. ..... P 887
Bergstein, R. M. ..... P 887
Bergstein, S. ..... P 887
Bogoslowsky, B. ..... P 892
Bo vin, J. L. 849
Bolin, G. 880
Bonebrake, G. M. ..... P 895
Bonham, L. F. ..... P 887
Boston Envelope Co. ..... P 892
Boyer, R. F. 867
Brand, O. W. 859
Bredlik, V. ..... P 891
Breyfogle, R. H. ..... P 895
Brown, A. 867
Bryce, J. ..... P 893
Buchanan, C. H. ..... P 887
Buckman, S. J. 857
Bueche, A. M. 867
Burgoon, J. P. ..... P 890
Butschek, G. 885
Callahan, T. P. 872
Calver, H. N. 861
Campbell, H. 839
Canadian Industries Limited ..... P 900
Carman, E. 864
Carney, C. J., Jr. 856
Charles, G. K. ..... P 894
Chédin, J. 839
Cheney Bigelow Wire Works Incorporated ..... P 895
Chicago Carton Company ..... P 888
Cincinnati Industries, Inc. ..... P 898
Clem, E. W. ..... P 894
Coleman, W. F. ..... P 886
Collins, T. T., Jr. 879
Conant, F. S. 867
Connor, C. M. 862
Cooper, P. E. 859
Crane, Wa. B. ..... P 887
Crane, Wi. B., Jr. ..... P 887
Crary, J. D. ..... P 888
Cross, W. W. ..... P 896
Currie, H. 854
Dadswell, H. E. 877
Daniel, J. H., Jr. ..... P 901
Davey, S. M. 862
Davies, J. M. 867
Dawson, R. D. ..... P 899
Day, F. T. 862
Debye, P. 867
deGryse, J. J. 848
Dexter, C. H., & Sons, Inc. ..... P 897
Dillon, J. H. 846
Dominion Envelope Company Limited P 896
Doub, L. ..... P 889
Dow Corning Corporation ..... P 898
Draman, R. E. ..... P 900
Dunning, R. M. ..... P 890
du Pont de Nemours, E. I., and Company ..... P 886
Dyke, G. E. 836
Eaton, L. B. ..... P 892
Edwards, J. 854
Eger, L. W. ..... P 898
Ekholm, B. 872
Elilä, K. L. ..... P 895
Elliott, J. H. 879
Ender, C. D. ..... P 895
Enebo, L. 845
Enroth, A. 842
Erdtman, H. 882
Erickson, D. R. 858
Farkuchen, I. 867
Farrell, J. A., Jr. 871
Farrell, R. A. ..... P 896
Farrington Manufacturing Company P 899
The Firestone Tire & Rubber Company ..... P 900
Fischer, E. K. 874
Fisher, D. B. ..... P 893
Flaschner, L. 884
Fort Wayne Corrugated Paper Company 837
Fosnaess, G. ..... P 891
Fraser, R. L. 854
Freydberg Bros.-Strauss, Inc. ..... P 888
Frost, F. H. 858
Gagnon, P. E. 849
Gallup, B. E. ..... P 887
The Gardner Board and Carton Co. P 891

Gee, C. C. 845
General Aniline & Film Corporation P 898
Geohegan, K. P. 865
Gilmore, G. D. 866
Gluck, F. C. ..... P 889
Gollub, M. ..... P 888
Govaerts, R. 840
Gray, D. E. 869
Green, J. W. 842
Gustafsson, K.-F. 873
Guth, E. 866
Guyer, R. ..... P 890
Hainer, R. M. 867
Hall, G. L. 867
Hall, W. G. 853
Halstead, P. R. ..... P 899
Hamadr 867
Hamly, D. H. 842
Hand, C. E. 845
Harper, V. L. 880
Harrison, J. B. D. 847
Hastings, E. C. 849
Hastings, R. ..... P 901
Hawkins, W. H. ..... P 888
Heikel, G. F. 874
Henry, S. W. ..... P 892
Hercules Powder Company P 895, P 896
Heritage, C. C. ..... P 887
Hermans, P. H. 883
Herrent, P. 840
Heuser, E. 841
Heys, R. C. 854
Hill, Edward H. 874
Hirst, E. L. 838, 847
Holderby, J. M. 875
Holmes, M. C. 842
Horowitz, K. H. 879
Hrubesky, C. E. 837
Hsiao, C. C. 867
Hutchinson, W. S. ..... P 889
Iles, W. G. 864
Industrial Tape Corporation ..... P 898
International Paper Company ..... P 899
Irmiter, R. 857
Irmscher, H. O. ..... P 892
Isherwood, F. A. 838
Ivey, D. G. 866
Izard, E. F. 867
Jaks, R. 868
James, B. Y. ..... P 897
Jensen, W. 849
Jermyn, M. A. 838
Jicwood Limited ..... P 887
Johnson, P. 839
Jones, E. J., Jr. 849
Jones, J. K. N. 838
Journal of Applied Physics 866
Kalamazoo Vegetable Parchment Company 862
Karfiol, E. ..... P 897
Kast, W. 884
K'Burg, P. B. ..... P 886
King, C. F. 868
King, G. W. 867
Kolb, H. J. 867
Kollmann, F. 837
Kono Mead Equipment Corporation P 893
Konow, R. von 834
Kotte, H. 849, 851
Krall, W. ..... P 897
Krieble, J. G. 878
Kuebler, J. W. 857
Kunz, B. P. ..... P 893
Landes, C. G. ..... P 901
Langbo, G. ..... P 894
Lange, H. 847
Larinkari, J. 850
Lathrop, E. C. 836
Lauer, K. 868
Leaf Brands, Inc. ..... P 888
Leatherman, M. ..... P 900
Ledingham, G. A. 876
Lindblad, R. 850
Lindroth, A. 876
Ljungquist, E. R. ..... P 893
Lobell, R. M. ..... P 888
Lodding Engineering Corporation ..P 893
Lowry, E. M. 864
Lundgren, N. 880
Luostarinen, O. V. 882
McCarthy, J. L. ..... P 900
MacKenzie, W. E. ..... P 894
Macklem, H. G. 875
McLaughlin, R. R. 877
McLellan, E. W., Co. ..... P 890
McLellan, R. I. ..... P 890
McMahon, H. O. 867
Magnet Cove Barium Corporation ..P 901
Makara, F. 863
Marathon Corporation ..... P 890
Marathon Paper Mills Company ...P 896
Marin, J. 866
Mark, H. 867
Marsh, E. J. 856
Marshall, H. B. 877
Masonite Corporation ..... P 889
Masson, C. R. 838, 839
Mathieson Chemical Corporation ....P 889
Mead, H. A. ..... P 892
Meals, R. N. 857
Melville, H. W. 838, 839
Mickelson, O. 863
Middleton, W. E. K. 842
Miles, G. W. ..... P 893
Miller, E. 867
Miller, L. 857
Mills, R. T. ..... P 886
Milnes, A. 852
Milprint, Inc. ..... P 897
Minerva Wax Paper Company ....P 889
Minnesota Mining & Manufacturing Company ..... P 897
Mohr, W. J. ..... P 897
Monsanto Chemical Company ..... P 900
Moore, W. C. 843
Morand, E. ..... P 890
Morawetz, H. 834
Morris, B. M. ..... P 896
Mrowca, B. A. 866
Mueller, M. F. 872
Munton, J. P. ..... P 894
Murray, D. J., Manufacturing Co. ..P 894
Naffziger, T. R. 836
Nash, J. P. 855
National Urn Bag Co., Inc. ..... P 892
Neumann, S. ..... P 897
Newsom, K. K. ..... P 899
Nordberg, O. ..... P 901
Notar, C. J. ..... P 899
Notar, R. H. ..... P 899
Osborne, F. H. ..... P 897
Oxtoby, F. 863
Packaging Parade 843, 844
Paper Patents Company ..... P 896
Paper Sales 863
Paper Strap, Inc. ..... P 888
Parke, Davis & Company ..... P 889
Paton, A. W. 855
Pattison, R. W. 868
Pearl, I. A. 878, 881
Pehrson, S. O. 873
Pellinen, H. 858
Penn, W. S. 866
The Personal Products Corporation .P 887
Petersen, N. H. ..... P 888
Phillips, H. G. 859
Piazze, T. E. ..... P 893
Pneumatic Scale Corporation, Limited ..... P 892
Polovtseff, B. ..... P 887

Rabkin, W. ..... P 899
Rafoth, B. A. ..... P 890
Reichardt, C. H. 846
Reichert, J. S. ..... P 886
Rennerfelt, E. 882, 883
Rice, F. G. H. ..... P 900
Rice Barton Corporation ..... P 894
Richardson, R. R. ..... P 888
Richter, J. 844
Ringler, W. A. ..... P 891
Ritchie, J. L. 881
Rittenhouse, R. C. 842
Roberts, A. G. 840
Roberts, C. C. 856
Roehm, W. A. ..... P 895, P 897
Rosen, S. ..... P 897
Rosmait, J. A. ..... P 894
Rote, J. G., Jr. ..... P 898
Rowe, W. W. ..... P 898
Royce, C. K. 873
The Ruberoid Co. ..... P 887
St. John, E. 868
Samuelson, O. 869, 877
Sanford, R. S. ..... P 888
Sauer, J. A. 866
Savage, J. V. 835
Schaevitz, H. 846
Schwartz, A. 871
Shand Kydd Limited ..... P 897
Sharman, C. F. 864
Shell Development Company ..... P 899
Shellmar Products Corporation ..... P 893
Sherman, J. O. ..... P 893
Shipstone, B. A. 852
Shockley, W. 841
Skark, L. 868
Slifkin, S. C. ..... P 898
Sliwinski, V. X. 874
Smith, D. V. ..... P 893
Smith, J. C. 866
Snow, C. B. ..... P 901
Snow, E. A. 834
Sogas, C. M. ..... P 892
Sogas, S. M. ..... P 892
Sohn, A. W. 881
Southland Paper Converting Company ..... P 899
Spencer, H. S. 864
Spencer, R. S. 866
Stauffer, W. O. ..... P 886
Steffens, H. G. 857
Stitt, W. D. 844
Stow, F. S., Jr. 879
Sun Chemical Corporation ..... P 898
Syme, T. D. 860
Technical Association of the Pulp and Paper Industry 876
Temperley 851
The Texas Company 850
Thayer, M. E. ..... P 898
Thomas, E. E. 851
Thompson, C. H. ..... P 889
Thurman, G. R. 867
Topping, ... 835
Törnqvist, L. 860
Trodson, B. L. 863
United States Envelope Company .. P 897
Van den Akker, J. A. 841
Van Dyke, O. W. ..... P 901
Van Kampen, G. R. 853
Van Rosen, R. ..... P 891
Varner, A. E. ..... P 889
Vernon 880
Vicker, R. 837
"Vinett" 861
Virtu, Inc. ..... P 895, P 897
Vogelsang, C. A. 856
Vogt, L. E. ..... P 899
Vuorisalo, P. 865
Wagner, C. L. ..... P 896
Waldorf Paper Products Company .. P 890
Walker, J. E. ..... P 896
Wardrop, A. B. 877
Weidinger, A. 883
Weidner, C. L. ..... P 898
Weiss, W. 879
West, C. J. 863
West, W. H. ..... P 898
Westerholm, W. 867
Whitwell, J. C. 878
Williams, R. O. ..... P 891
Williams-Bauer Corporation ..... P 891
Wilson, L. H. ..... P 901
Winkler, E. 884
Wise, L. E. 842
Witte, R. S. 866
Wood Conversion Company ..... P 887
Work, R. W. 884
Wright 855
Wrigley, W., Jr., Company ..... P 895
Young, G. H. 844
Yount, S. G. ..... P 899
Yunker, W. S. 848

LIBRARY SERVICE

The Library of The Institute of Paper Chemistry is located in the Kimberly Memorial Building. Its purpose is to serve the students and the faculty of The Institute of Paper Chemistry and the chemists and technologists of the pulp and paper industry.

To contributing members it gives the following service:

A monthly bulletin is issued, listing all new books and periodicals added to the library and containing titles and abstracts of articles published during the previous month in the field of pulp and paper chemistry and technology. The annual index carries a list of periodicals currently received.

At a reasonable cost the librarian will furnish complete reference lists on chemical and technical problems for member mills, and will procure translations, photostats, or abstracts of the articles listed. Upon request, member mills working on special problems will be kept in touch with new publications related to their work.

Reviews of new publications pertaining to the field of pulp and papermaking will be included from time to time.

During the summer months and until the start of the new school year in September, the library will be open Monday through Friday from 8:00 to 4:30. Saturday it closes at 12:00 noon.